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# Effects of Motivational Interviewing on Levels of Physical Activity in Older Adults

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EFFECTS OF MOTIVATIONAL INTERVIEWING ON LEVELS OF PHYSICAL  
ACTIVITY IN OLDER ADULTS

by

Anna M. Pignol

Master of Arts, University of North Dakota, 2005

A Dissertation

Submitted to the Graduate Faculty

of the

University of North Dakota

in partial fulfilment of the requirements

for the degree of

Doctor of Philosophy

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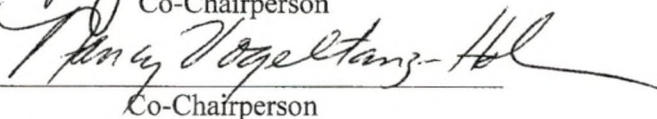
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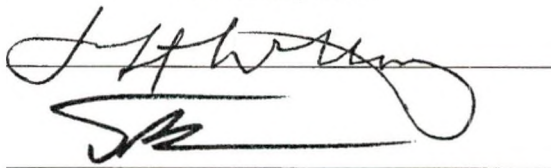
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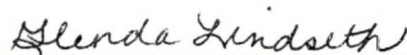


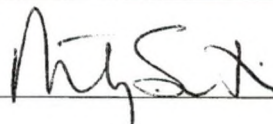
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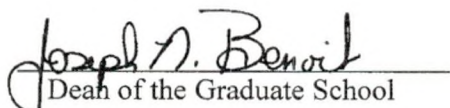
  
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## ABSTRACT

In Canada, 68% of women and 53% of men 65 and older are inactive. Physical activity is crucial for older adults being able to maintain physical and mental health, as well as quality of life. Even the frail, chronically ill, and very old adults can increase mobility and functioning through physical activity. The current study examined the effects of Motivational Interviewing (MI) on levels of physical activity in older adults. A total of 86 participants aged 55 and older were recruited in Prince Edward Island. Participants were randomly assigned by gender to the intervention plus information or to an information only condition. Participants in the intervention condition participated in four weekly telephone motivational interviews focused on physical activity. All participants were assessed at baseline, post-treatment, and six month follow-up. Results from this study found that the participants in the motivational interview condition had significantly higher levels of frequency of physical activity and total weekly caloric expenditure from physical activity at post-treatment than participants in the control group. The treatment effects were not maintained at six-month follow-up; however, there was a protective factor of the intervention in that participants in the MI condition returned to baseline levels of physical activity at six-month follow-up while participants in the control condition reported significant decreases in levels of physical activity from baseline to six-month follow-up. These findings support the use of motivational interviewing as a cost-effective technique for increasing levels of physical activity in older adults over the short term.

In loving memory of Clinton B. Evans

## CHAPTER I

### INTRODUCTION

The majority of people in North America engage in low levels of physical activity. The health risks for people who are inactive are numerous. Some of these risks include premature death, heart disease, obesity, high blood pressure, adult-onset diabetes, osteoporosis, stroke, depression and colon cancer (Canada's Physical Activity Guide, 2003; Centers for Disease Control, 2006).

Physical activity has been shown to reduce a person's risk of dying from these and other diseases (U.S. Department of Health, 2002). In addition to disease prevention, there are many benefits of regular physical activity. These benefits include better health, improved fitness, better posture and balance, better self esteem, weight control, stronger muscles and bones, feeling more energetic, relaxation, reduced stress, reduced depression and anxiety, continued independent living in later life, and reduction of falls in older adults (Canada's Physical Activity Guide, 2003; U.S. Department of Health, 2002).

In addition to the health risks, there are major costs to the health care system for both prevention and treatment of the chronic conditions related to inactivity. Some of these costs include those from visits to the physician, ambulance services, medications, hospitalization and nursing home care (U.S. Department of Health, 2002), as well as the loss of wages due to illness or disability and even premature death (U.S. Department of Health, 2002).



Physical activity in older adults can be especially helpful because it is a crucial component in ensuring that this population maintain or even improve physical and mental functioning, along with increasing rates of independent living and reducing rates of mortality (Buchner, Beresford, Larson, LaCroix & Wagner, 1992; Canada's Physical Activity Guide, 2003). The current study examined the effects of motivational interviewing as an intervention designed to increase levels of physical activity in older adults.

### Benefits of Physical Activity for Older Adults

It is generally assumed that aging is characterized by a decline in physiological capacity, as well as a reduction in ability to adapt to challenges (Wagner, LaCroix, Buchner, & Larson, 1992). In their review of the literature of physical activity and older adults, Wagner et al. (1992) suggest that large declines in function are not inevitable consequences of getting older, and that a preservation of function represents successful aging. The authors theorize that inactivity in older adults actually accelerates the physiological rates of decline, which in turn can lead to the individual no longer having the ability to prevent or recover from acute stresses. For example, declines in strength and aerobic capacity are typically associated with aging.

Aerobic capacity is the body's ability to produce energy by using oxygen (Buchner et al., 1992). Aerobic capacity declines with age, with a 50% capacity loss occurring between the ages of 30 and 80 years. These rates of decline are much higher in sedentary adults than they are in active adults, meaning that physical activity can actually slow the rate of decline of aerobic capacity by up to two-thirds (Mahler, Cunningham, &

Curfman, 1986). One of the primary benefits of reducing the decline of aerobic capacity in older adults is preserving their ability to perform daily activities (Buchner et al., 1992).

Strength is also directly related to physical function, in that as muscular strength declines, a person may get to the point when he or she no longer has the strength that it takes to transfer his or her body weight, such as would be required when getting out of a chair (Buchner et al., 1992). Physical activity, most notably resistance training and vigorous exercises, has been shown to increase strength in older adults. Older adults that engage in strengthening activities are able to maintain and even improve current muscle strength, and thus prolong the time that they are functionally able to care for themselves (Fiatarone et al., 1990).

Physical activity is crucial for older adults being able to maintain physical and mental health, as well as quality of life. Older adults who are physically active are more likely to remain free of more than eight major chronic conditions over a twelve year time frame (Wagner et al., 1992). For example, both inactivity and aging are associated with bone loss, with studies finding dramatic rates of bone loss resulting from enforced bed rest (Krolner & Toft, 1983). Weight bearing physical activity reduces rate of bone loss, which reduces risks of osteoporosis as well as risk of fractures. Research has demonstrated that physical activity in the previous six weeks was correlated with reduced risk of hip fracture (Cooper, Barker, & Wickham, 1988). Physical activity is very important for post-menopausal women, because muscle strengthening protects against the rapid decline in bone mass often present in this population (U.S. Department of Health, 2002). Physical activity helps to maintain strength and flexibility, and balance and

coordination, all of which reduce the risk of falls (Buchner et al., 1992; Canada's Physical Activity Guide, 2003; Stevens, Powell, Smith, Wingo, & Sattin, 1997). Even the frail, chronically ill, and very old adults can increase mobility and functioning through physical activity (Buchner et al., 1992; U.S. Department of Health, 2002). Independent living is an issue of great importance for people as they age. In order for older persons to be able to safely live on their own, they need to be able to do many actions that are maintained through physical activity including reaching, bending, lifting, carrying, and moving around easily (Canada's Physical Activity Guide, 2003).

Physical activity has also been shown to be beneficial for people with rheumatoid arthritis and osteoarthritis (Buchner et al., 1992; U.S. Department of health, 2002). Research has demonstrated that arthritic patients that exercised had improved functional status, which remained at three, eight and nine month follow-ups. Not only was exercise shown to improve functional status in arthritic patients, it was also found to alleviate pain symptoms (Ekdhahl, Andersson, Moritz, & Svensson, 1990; Fisher, Pedergast, Gresham, & Calkins, 1991). Physical activity can reduce the risks of coronary heart disease by affecting lipid profiles in older adults, with people who exercise regularly at a moderate intensity demonstrating higher levels of HDL or "good" cholesterol (Wagner et al., 1992).

Physical activity has also been shown to alleviate some of the symptoms of anxiety and depression, and is part of recommended treatment for depression in older adults (U.S. Department of Health, 2002). Regular physical activity may also reduce cognitive decline in older adults (U.S. Department of Health, 2002). Wagner et al. (1992)



found evidence that active older adults performed better cognitively than sedentary older adults, and in some cases performed as well as much younger adults. It is theorized that improvements in cognition are associated with improved blood flow to the brain, and also to oxygen metabolism in the brain (Buchner et al., 1992).

Overall, older adults who are physically active have a reduced risk of death. Inactivity has been associated with a 30 to 40% increased risk of death. The relationship between physical activity and mortality becomes stronger with age (Rotevatn, Akslen, & Bjelke, 1989). Older adults who initiate physical activity even after a lifetime of sedentary behavior demonstrated substantial gains in life expectancy (Wagner et al., 1992). Despite all of the benefits of physical activity for seniors, more than 60% of older adults are inactive (Physical Activity for Everyone, 2006). As people age, there is increased limitation in their ability to carry out basic activities of daily living, and a significant portion of this decline has been shown to be the result of physical inactivity (Wagner et al., 1992).

#### Physical Activity in Canada and Prince Edward Island

The U.S. Centers for Disease Control and Prevention recommends that all adults should accumulate at least 30 minutes of moderate level physical activity on 5 or more days of the week (Physical Activity for Everyone, 2006). It is important for older adults to engage in a variety of physical activities that include activities that build aerobic endurance, strength, balance, and flexibility (Physical Activity for Everyone, 2006).

Despite recommendations of physical activity in order to obtain optimal health, over 60% of older adults in North America are inactive. Older women tend to be less



physically active than older men (U.S. Department of Health, 2002). According to a survey conducted in 2001, 56% of Canadians are inactive, and physical inactivity increases with age (2002 Physical Activity Monitor: Canadian Fitness and Lifestyle Research Institute). In Canada, 68% of women and 53% of men 65 and older are inactive (Craig & Cameron, 2002). Results from the Canadian National Population Health Survey found a geographical difference in activity levels of older adults with those in the eastern provinces of Canada being less active than those from the western provinces (Kaplan et al., 2001). Other predictors for frequent levels of physical activity in adults aged 65 and older in Canada include the following: being male, younger age, lower body mass index, higher levels of education, a lack of injuries or other chronic conditions that limit functioning, higher levels of education, being unmarried, being a non-smoker, and having lower levels of psychological distress (Kaplan, Newsom, McFarland, & Lu, 2001).

Adults residing in Prince Edward Island, Canada are largely inactive, with 62% of the Island's population not getting enough exercise for health benefits (Canadian Fitness and Lifestyle Research Institute, 2001). Despite the high levels of inactivity in Prince Edward Island, research has shown a trend towards increased adoption of physical activity, with an 8% rate of improvement from 1990 (70% of the population inactive) to 1999 (62% of the population inactive) (Canadian Fitness and Lifestyle Research Institute, 2001). Despite the increase in physical activity on Prince Edward Island, the province's adults are clearly less active than those in the rest of Canada. Although there are no statistics available for the level of activity in older adults in Prince Edward Island, it is assumed that the rates of inactivity for this group follow the trends of the adult population

on Prince Edward Island with higher levels of inactivity in Island older adults than in the rest of Canada. Rates of obesity, heart disease, stroke, premature death, and many other conditions are elevated in Canadians that are physically inactive (Health Canada, 2006). With such high levels of inactivity in older adults in Prince Edward Island and Canada, it is very important for health professionals to gain a better understanding of physical activity levels and influences in this population in order to be able to help older adults to change their behavior and become more physically active.

#### Transtheoretical Model of Change/Stages of Change

The Transtheoretical Model of change, often referred to as the Stages of Change was developed by Prochaska and DiClemente (1982) to help in the understanding of how people change negative health-related behaviors to more positive behaviors. The stages of change model describes the process that people go through in modifying their behaviors. The progression occurs through the following five stages: precontemplation, contemplation, preparation, action and maintenance.

In regards to physical activity, the precontemplation stage describes a person who is inactive and has no intention of initiating physical activity or increasing their level of physical activity any time in the foreseeable future. Many people at this stage are not fully aware of the negative consequences of being inactive (Prochaska & DiClemente, 1992). A person is also in the precontemplation stage if they are aware of the problem, perhaps even wishing to change it, but are not seriously considering changing in the next six months (Prochaska & DiClemente, 1992).



The contemplation stage describes a person who is aware that a problem exists, and is seriously thinking about engaging in physical activity, but has not yet made a commitment to start being physically active or to increase their level of physical activity (Prochaska & DiClemente, 1992). People in the contemplation stage are thinking about becoming physically active or increasing their level of physical activity in the next six months. The six month time frame is based on the assumption that most people planning behavior changes do not think farther than six months into the future (Prochaska et al., 1994). During the contemplation stage, people weigh the pros and cons of the problem and possible solutions to the problem (Prochaska & DiClemente, 1992).

The preparation stage encompasses both intention and behavior. A person who is in the preparation stage is intending on becoming physically active or increasing their level of physical activity in the next month, and has made some movement towards physical activity. The movement towards physical activity can be anything from joining a gym, working ten minute walks into the daily schedule, or making plans with a friend to begin an exercise program (Prochaska & DiClemente, 1992).

The action stage describes a person who has initiated physical activity, or increased their level of physical activity in order to meet recommended guidelines. To be in the action stage the person must have successfully reached the recommended level of physical activity sometime in the past six months (Prochaska & DiClemente, 1992).

The maintenance stage occurs when a person is currently meeting recommended levels of physical activity, and has been doing so for at least six months. During this stage, a person must work hard to maintain their level of activity and prevent a relapse to

a sedentary lifestyle. This means that the person must consistently engage in physical activity, and overcome barriers that may make it difficult for them to continue being physically active (Prochaska & DiClemente, 1992).

Prochaska and DiClemente (1992) describe movement through the different stages as occurring in a spiral pattern, with people moving forward through the stages but also often relapsing to an earlier stage. Relapse through the stages occurs very frequently in people trying to change health behaviors, with the majority of people in the action stage not making it to the maintenance stage in their first attempt. Even though people tend to relapse to an earlier stage, the vast majority of people move back to either the contemplation stage or the preparation stage after failing at an attempt to change, rather than the precontemplation stage. These findings suggest that even though it is very common for people to relapse back to earlier stages, it is still beneficial for them to have been in the action stage, even for a short time, because the next time through the cycle they likely will move or progress further in the change process (Prochaska & DiClemente, 1992).

Understanding the stages of change is crucial for interventions to increase healthy behaviors, because the vast majority of people are not in the action stage. Determining the stage of change of each person in an intervention and tailoring the treatment to his or her stage of change leads to higher rates of success in getting people to adopt healthy behaviors (Prochaska & DiClemente, 1992).

Prochaska and DiClemente (1992) report that it is possible to predict progress for each person in treatment based on their stage of change at the beginning of the



intervention. An intervention should be viewed as successful if it moves clients from one stage of change to the next, even if the client is not in the action stage at the end of the treatment, because clients that progress from one stage to the next during the first month of treatment have double the chance of reaching the action stage in the next six months (Prochaska & DiClemente, 1992).

### *Use of Stages of Change in Health*

Improving healthy lifestyle behavior is difficult, but the stages of change model provides a mechanism for understanding the advances and relapses that occur as people try to adopt healthier behavior. For example, in an early review of studies examining the stages of change and decisional balance in understanding changes in problem behaviors, Prochaska et al. (1994) found the stages of change model to be both comprehensive and generalizable to a variety of health problems and different populations. In this early review, Prochaska et al. (1994) found that the stages of change model was very generalizable to a variety of problems (i.e., smoking cessation, high-fat diets, safer sex, condom use, quitting cocaine, exercise initiation, weight loss, use of sunscreen, adolescent delinquent behaviors, radon gas exposure, and mammography screening), and that it was useful in describing both addictive and non-addictive behaviors. They also found that it was useful for behaviors that occur numerous times a day, behaviors that occur once a year, public and private behaviors, socially acceptable and socially unacceptable behaviors, and both legal and illegal behaviors. Finally, they reported that the model can be generalized to both acquisition of positive behaviors and the cessation of negative behaviors. Specifically, Prochaska et al. (1994) found that precontemplators

identified more cons than pros with changing the behavior, while the reverse was true of participants in the action stage for 11 of the 12 behaviors (quitting cocaine was the exception). Results from this study also found that participants in the contemplation stage reported more pros for changing their behavior than did participants in the precontemplation stage, and that the cons of changing behavior for participants in the action stage were fewer than for those in the contemplation stage. The majority of the studies also found that the ratio of pros to cons changed during the contemplation and preparation stages, leading to the possibility that as people move towards a new behavior they begin to identify more positives than negatives with adopting the new behavior (Prochaska et al., 1994).

#### *Use of Stages of Change in Physical Activity*

The stages of change has more recently been used in studies of physical activity interventions, with numerous reports of significant results in the use of stage of change tailored interventions (Bock, Marcus, & Pinto, 2001). An intervention in the primary care setting aimed at examining changes in physical activity was conducted with 255 sedentary adults aged 18 and older (Calfas, Sallis, Oldenburg, & Ffrench, 1997). Participants were assigned to either a control group, or a brief, behaviorally-based counselling session conducted by physicians. Participants in the intervention received the brief counselling session as part of their routine visit to their physician, and also received a telephone call two weeks after their visit to engage in problem solving regarding their activity goals. All participants were assessed at baseline and at follow-up (four to six weeks) for stage of change, processes of change, self-efficacy for exercise, and social



support for exercise. Results from this study found that participants that were counselled improved significantly more than those in the control group on both behavioral and cognitive processes of change, resulting in forward movement along the stages of change and increases in physical activity (Calfas et al., 1997).

Bock et al. (2001) conducted a study to examine the effects of a motivationally-tailored intervention based on stage of change on maintenance of physical activity over a 12-month period. A total of 150 sedentary men and women participated in the study, with an average age of 44.3 years. Participants were randomly assigned to either the treatment group based on stage of change for initiating physical activity or a standard print-based intervention. All participants received assessment and intervention material through the mail at baseline, one-, three-, and six-months. In addition, six months after treatment ended a follow-up assessment was conducted (Bock et al., 2001).

The standard intervention and the individualized, stage-of-change intervention groups both demonstrated significant increases in time spent engaged in physical activity from baseline to six months, but the group that received the individualized intervention increased their level of physical activity significantly more compared to the standard group. Moreover, the group that received the stage-of-change intervention was significantly more likely than the standard intervention group to meet CDC recommendations for physical activity (Bock et al., 2001).

Results from this study also demonstrated that participants in the maintenance and action stages of change reported significantly more minutes of physical activity per week than participants in the preparation, contemplation and precontemplation stages.

Participants in the individualized, stage-of-change intervention group were more likely to be in the action or maintenance stage of change by month 12 (six months after treatment), than participants in the standard group. These findings support the use of interventions based on each participant's stage of change as useful in the initiation and maintenance of physical activity (Bock et al., 2001).

*Use of stages of change and physical activity with older adults.* The stages-of-change model has also been used in physical activity research with older adults. Litt, Kleppinger, and Judge (2002) conducted a study to examine predictors of long-term maintenance to an exercise program for older women. Participants consisted of 189 women with low bone density between the ages of 59 and 78 years. Understanding exercise behavior in this population is important because despite the fact that physical activity has been shown to prevent and even reverse bone loss, attrition rates during the first six months of exercise programs are very high – sometimes up to 50% (Litt, Kleppinger, & Judge, 2002). Participants were randomly assigned to one of two exercise intervention treatments, focused on either the lower or upper body. No differences were found between level of moderate exercise and exercise condition. Stage of change at the beginning of the study significantly predicted level of moderate exercise at the three-month assessment. Stage of change at the beginning of the study, however, was not found to be predictive of exercise behavior at 12-month follow-up (Litt, Kleppinger, & Judge, 2002).

A study of Exercise and Nutrition in Older Rhode Islanders (SENIOR project) was conducted with 1234 men and women aged 65 years and older (Riebe, Garber, Rossi,



Greany, Nigg, Lees, Burbank, & Clark, 2005). The SENIOR project was a 12-month, community-based intervention. A follow-up was conducted 12 months later. The average age of participants was 75.7 years. At baseline the majority of the participants were in the precontemplation stage (21.0%) or in the maintenance stage (50.4%). Participants were divided into three age groups: 65-74, 75-84, and 85 years and older. Results of this study found that the youngest age group reported the highest level of physical activity, while the oldest age group reported the lowest level of physical activity. Analyses also demonstrated that participants in the action and maintenance stages of change reported higher levels of physical activity than participants in the precontemplation, contemplation, and preparation stages of change. Participants in the maintenance stage of change reported higher levels of physical activity than those in the action stage of change. When physical ability was assessed, participants in the precontemplation stage had the lowest scores when compared to participants in all other stages of change (Riebe et al., 2005).

Heesch, Brown, and Blanton (2000) examined barriers to exercise in older women of different racial/ethnic groups at the same stage of change. A total of 2912 women between the ages 40 to 93 years were interviewed in the United States (769 White women, 745 African American women, 738 Native American/Native Alaskan women, and 660 Hispanic women). In the total sample, 24 percent of the participants were in the precontemplation stage, 16 percent were in the contemplation stage, 5 percent were in the preparation stage, 6 percent were in the action stage and 49 percent were in the maintenance stage (Heesch, Brown & Blanton, 2000).

Results from this study found that lack of energy, being tired, being in bad health, and fear of injury were the most frequently reported barriers at the precontemplation stage for all ethnic/racial groups. These barriers were reported more frequently in the precontemplation stage than in any of the other stages of change. For women in the contemplation stage, the most common barriers across racial groups included lacking time to exercise, lacking a safe place to exercise and care-giving duties. For women in the preparation and action stages, the most frequently reported barrier was that of being self-conscious about one's looks (Heesch, Brown, & Blanton, 2000).

When differences among racial/ethnic groups were examined, results showed that the most significant barriers in the precontemplation stage for White and Native American/Native Alaskan women included being too tired and being in bad health. For African American women the sole barrier was being too tired, and for Hispanic women the barriers at the precontemplation stage included being in bad health and being afraid of injury (Heesch, Brown & Blanton, 2000). In the contemplation stage, White women reported that fear of injury and lack of time were barriers to exercise, while Hispanic women reported that lack of time and being too tired were barriers, and African American women reported that lacking a safe place to exercise was a barrier to exercise. In the preparation and action stages, exercise barriers for White women included being too tired and being self-conscious about one's looks, exercise barriers for African American women included fear of injury and being too tired, exercise barriers for Native American/Native Alaskan women included lack of energy and being too tired, while barriers for Hispanics included lack of energy and being discouraged by others (Heesch,

Brown & Blanton, 2000). The results of this study suggest the importance of understanding differences in barriers across racial/ethnic groups even within the same stage of change.

The stages of change model has been found to be useful in understanding how people adopt, increase, maintain, decrease, and even stop healthy behaviors, including physical activity. This model has also been useful in allowing researchers to determine if participants have benefited from the intervention, and has been found to be an accurate assessment of physical activity in older adults.

In order to gain a complete understanding of the adoption of physical activity in older adults it is important to account for environmental and personal factors in addition to stage of change, including self-efficacy and social support for physical activity.

#### Social Cognitive Theory and Self-Efficacy

Social cognitive theory has also been used as a theoretical framework to understand and examine how to increase physical activity (Marcus & Forsyth, 2003). Social cognitive theory proposes that interactions between personal factors, the environment and components of the behavior of focus all play a role in behavior change, such as physical activity (Marcus & Forsyth, 2003; U.S. Surgeon General, 1999). Personal factors can be composed of a variety of things, such as current fitness level, and previous experiences with physical activity. Environmental factors refer to anything in the environment that may impact the behavior, such as having exercise facilities in the neighbourhood or having an exercise partner that lives close by. A factor of the behavior that could play a role in the initiation of physical activity would be whether or not the



individual finds the activity enjoyable (Marcus & Forsyth, 2003). The person making the behavioral change must perceive some sort of incentive for engaging in the behavior in order for the change to occur (Marcus & Forsyth, 2003). For example, the positives of engaging in physical activity must outweigh the negatives, and these positives must be of value to the individual attempting the behavior change. The person attempting to change their level of physical activity must believe that the positive outcomes or benefits of physical activity will occur for them if they increase their level of physical activity (U.S. Surgeon General, 1999).

Positive outcomes and benefits can be either immediate or long-term. An example of an immediate consequence of physical activity would be feeling energized, a long-term benefit could be weight control. Regardless of the benefits perceived from engaging in physical activity, one of the most important aspects of behavior change is that of self-efficacy, or the individual's confidence in his or her ability to successfully perform the targeted behavior (Marcus & Forsyth, 2003; U.S. Surgeon General, 1999).

### *Self-Efficacy and Physical Activity*

Numerous studies have examined self-efficacy and its relationship to physical activity and/or exercise behavior. Marcus, Pate and Dunn (2002) conducted a review of the literature in order to gain a better understanding of psychosocial mediators of physical activity. This review found that some studies showed increases in self-efficacy for women but not for men, and others showed no relationship between self-efficacy and physical activity (Lewis et al., 2001).

In another study, Calfas et al. (1997) reported that self-efficacy is an important factor in understanding physical activity levels. Self-efficacy was found to be a significant predictor of physical activity levels at baseline and at a four-to-six-week, follow-up assessment. Similarly, Bock et al. (2001) showed that participants that became physically active enough to meet CDC recommended levels of physical activity had higher levels of self-efficacy for physical activity than participants who did not meet the recommendations.

In order to gain a better understanding of factors that can encourage mothers with children to engage in physical activity, Miller, Trost, and Brown (2002) conducted a study with 554 mothers randomly assigned to one of two interventions or a control group. The first intervention provided participants with printed information about overcoming barriers to physical activity, while the second group received the same printed information but also took part in a group that discussed strategies that could be used in the community to help mothers of young children engage in physical activity (Miller et al., 2002). Results of this study found that women in the group that discussed strategies were most likely to meet recommended guidelines for physical activity post intervention; however, these group differences were not found at follow-up. Results also demonstrated that self-efficacy scores significantly predicted level of physical activity post intervention, even when baseline levels of physical activity were controlled (Miller et al., 2002).

Self-efficacy's usefulness as a predictor of exercise behavior has been shown to vary depending on the type or form of self-efficacy examined. For example, an individual

may be highly confident in his or her ability to walk for half an hour, but may not feel as confident about being able to schedule walking five times a week. Self-efficacy can also refer to different situations, such as confidence in being able to be physically active while in a person's usual environment as opposed to confidence in being physically active while on vacation (Marcus & Forsyth, 2003). Rodgers, Hall, Blanchard, McAuley and Munroe (2002) examined both task and scheduling self-efficacy and their relationships with exercise behavior. Participants in this study were recruited from exercise classes and consisted of 243 people with a mean age of 30 years. Task self-efficacy refers to a person's confidence that they can perform the task – in this case exercising. Scheduling self-efficacy for exercise refers to a person's confidence that they will be able to organize their schedule to ensure that they have the time to exercise, and also that they can overcome any barriers that may make adhering to their exercise schedule difficult (Rodgers et al., 2002). Results from this study found that task self-efficacy was significantly related to behavioral intention for exercise, but that scheduling self-efficacy was not related to behavioral intention. When actual exercise behavior, rather than just intention, was examined, results demonstrated that scheduling self-efficacy was more strongly related to exercise behavior than task self-efficacy. Both scheduling self-efficacy and task self-efficacy were found to be significant predictors of exercise behavior (Rodgers et al., 2002).

#### *Self-Efficacy and Physical Activity in Older Adults*

Self-efficacy for physical activity has also been examined in older adults. In their study conducted on older women, Litt et al. (2002) found that participants with higher



levels of self-efficacy were significantly more likely to maintain exercise behavior over time, while those with lower levels of self-efficacy reported a decline in level of exercise at follow-up. Self-efficacy was found to be predictive of moderate exercise 12 months after treatment. Litt et al. (2002), however, did not find that self-efficacy was predictive of adoption of exercise behavior. Level of self-efficacy did predict participants' movements from action to maintenance stages of change.

A self-efficacy intervention was designed for older adults in order to improve self-efficacy for physical activity, as well as physical activity itself in older adults who had experienced a heart attack (Allison & Keller, 2004). Older adults ( $N=83$ ) with coronary heart disease were randomly assigned to a self-efficacy coaching intervention, an attention-control group, or usual care. Both the self-efficacy coaching intervention and the attention-control participants were contacted once every two weeks for a twelve-week period. Participants were assessed at baseline, six weeks, and at twelve weeks for self-efficacy, distance walked in six minutes, and physical activity level (Allison & Keller, 2004). When the relationship between physical activity and self-efficacy was examined, it was found that higher levels of self-efficacy were related to longer walking distances at six weeks and twelve weeks, but not at baseline. Self-efficacy scores also increased for all three groups over the course of the study, but at the end of the study, the participants receiving self-efficacy coaching had significantly higher levels of physical activity self-efficacy than participants in the other two groups. Participants in the self-efficacy coaching group also demonstrated greater increases in total distance walked at both six

and twelve weeks than did participants in the other two conditions (Allison & Keller, 2004).

A study examining cognitive versus social mediators of exercise adherence in older adults was conducted by Brassington, Atienza, Perczek, DiLorenzo, and King (2002) with 103 community-dwelling, older adults. The participants consisted of 67 women and 36 men with a mean age of 70.2 years. Participants were randomly assigned to one of two interventions: (a) stretching and flexibility exercises, or (b) moderate intensity endurance and strengthening exercises. Participants were assessed at baseline, seven months and at twelve months. Results found that the two programs had comparable rates of exercise adherence. Self-efficacy was found to be significantly related to exercise adherence at seven and twelve months, with participants with higher self-efficacy scores being more likely to be adhere to the exercise program at these follow-ups (Brassington et al., 2002).

### Social Support and Behavior Change

Social support is another factor that is often examined in regards to changes in health behaviors. It has been suggested that general social support is not enough to facilitate change in behaviors, but it is thought to be an important mediator of such change (Marcus & Forsyth, 2003). Social support is any support that is given to an individual by another person in order to encourage or facilitate behavior change (Marcus & Forsyth, 2003). Social support must be specific to the targeted behavior and different types of social support exist. One type is instrumental social support. Instrumental social support consists of an individual providing the person with something tangible that aids



in his or her effort to change behavior. An example of instrumental social support would be a gift of exercise equipment, or even transportation to an exercise facility (Marcus, & Forsyth, 2003). Another type of social support is emotional support. Emotional support occurs when another person lets the individual know that they care about and support their behavior change. This may be as simple as inquiring how a person's new exercise class is going. Informational social support occurs when a person is provided with information that aids or supports the behavior change, such as telling them about walking trails in the area (Marcus & Forsyth, 2003). The final type of social support is appraising social support, or providing positive feedback and encouragement to the person initiating the behavior change (Marcus & Forsyth, 2003).

#### *Social Support and Physical Activity*

Numerous studies have examined the relationship between social support and physical activity. In their review of the literature regarding mediators of physical activity, Lewis et al. (2002) reported that the relationship between social support and physical activity changes is not clear and the findings from various studies have been mixed. In one study reviewed by Lewis and colleagues, Sallis, Calfas, Alcaraz, Gehrman, and Johnson (1999) randomly assigned college students to either a course promoting physical activity or to a control course and found that social support was increased in women but not in men in the intervention group. Two studies reviewed by Lewis and colleagues examined worksite interventions and social support. The first study's intervention consisted of behavioral skills training to increase levels of physical activity (Nichols et al., 2000), while the second study's intervention focused on social cognitive theory and

physical activity (Hallam & Petosa, 1998). Results from both of these studies demonstrated no differences in social support between intervention and control groups (Hallam & Petosa, 1998; Nichols et al., 2000). A final study reviewed by Lewis et al. (2001) looked at an intervention designed to increase walking in ethnic minority women. This study found that social support in the intervention group increased from baseline to post-treatment, but decreased from post-treatment to five-month follow-up. However, level of social support at follow-up was still significantly higher than it was at baseline, although it was significantly lower than it was post-treatment (Castro, Sallis, Hickmann, Lee, & Chen, 1999).

Calfas et al. (1997) found that level of social support for physical activity was not related to actual levels of physical activity in participants receiving a primary care intervention at either baseline or four-to-six week follow-up. Social support from family, however, did show a trend of increasing in the participants who had received the intervention compared to participants in the control group (Calfas, et al., 1997).

In a study examining physical activity levels in mothers with young children, in which participants were randomly assigned to either a control group, or to receive printed information on physical activity and participate in a discussion group, Miller et al. (2002) found that partner support for physical activity was a significant predictor of meeting the recommended levels of physical activity post-intervention, even when baseline level of physical activity was controlled. This suggests that social support may be an important factor for caregivers in being able to meet recommended levels of physical activity.

### *Social Support and Physical Activity in Older Adults*

The relationship between social support and physical activity has also been examined in older adults. For example, Eyler et al. (1999) conducted a study to examine social support for physical activity in older minority women. Participants consisted of 2912 Black, White, Hispanic, and American Indian/Alaskan Native women aged 40 years and older. Participants were respondents to a national telephone survey that occurred in 1996 and 1997. The women in this study were assessed for physical activity social support, sedentary behavior, regular exercise, cumulative exercise and lifestyle activity. Eyler et al. (1999) found that participants with low physical activity social support were more likely to be sedentary, even when age, income, education and marital status were taken into consideration. Social support was not, however, found to be related to level of exercise assessed in participants that exercised regularly. This suggests that although physical activity social support may be important in initiating exercise, people with an established exercise routine may no longer rely on external motivation in order to maintain their exercise behavior (Eyler et al., 1999). There was no significant difference between social support from friends and social support from family for physical activity. In regards to differences among ethnic groups, Hispanic women were more likely to have higher levels of physical activity social support than other ethnic groups (Eyler et al., 1999).

Litt et al. (2002) also examined social support in relation to exercise behavior in older women. Results from their study found that social support was a significant predictor of level of moderate exercise at the beginning of the treatment. Social support



also predicted exercise maintenance at 12 months, with participants with more social support for exercise engaging in exercise on significantly more days a week than those with lower levels of social support. These results were found to be true regardless of level of social support at baseline (Litt et al., 2002).

A large study of older adults in Canada examined correlates of physical activity in 12,611 community dwelling adults aged 65 and older who completed the Canadian National Population Health Survey (Kaplan, Newsom, McFarland, & Lu, 2001). Results from this survey found that social support was associated with frequent physical activity late in life, but only for women.

Finally, Brassington et al. (2002) conducted a study in which participants received telephone counselling for 12 months with the emphasis on either aerobic and strength exercises, or on flexibility exercises. They found that social support for exercise in older adults was not related to level of exercise at baseline, nor was it found to be related to exercise adherence during the treatment at either seven months or twelve months.

### Motivational Interviewing

Motivational Interviewing is an intervention that emerged for changing health behaviors. Motivational Interviewing is a therapeutic approach that combines active cognitive behavioral strategies based on a client's current stage of change with principles of humanistic therapy (Burke, Arkowitz, & Menchola, 2003). Primarily designed to treat alcohol problems, Miller and Rollnick (2002) define Motivational Interviewing as "a client-centered, directive method for enhancing intrinsic motivation to change by exploring and resolving ambivalence (p.25)."



Motivational interviewing takes a collaborative approach to counselling, with the relationship between the client and the therapist being that of partners, rather than the therapist being the authority figure. The role of the therapist is to support the client, rather than to try to persuade or argue with them regarding the necessity of change (Miller & Rollnick, 2002).

When conducting motivational interviewing, the therapist does not try to tell the client what to do, but rather tries to elicit information and attitudes/opinions from the client. The main purpose behind motivational interviewing is to draw motivation for change from the client. The responsibility for changing belongs to the client, arising from within the client rather than being imposed on him or her. This allows for the client's own goals and values to be addressed in the decisions he or she makes regarding his or her behavior (Miller & Rollnick, 2002).

There are four general principles of motivational interviewing: expressing empathy, developing discrepancy, rolling with resistance, and supporting self-efficacy. The first principle of expressing empathy is described as fundamental to motivational interviewing by Miller and Rollnick (2002). Expressing empathy helps to stay within the framework of a client-centered therapy approach, and is achieved through reflective listening. Reflective listening refers to the therapist trying to understand the client's perspective and feelings without criticizing, blaming or judging them. The type of support given to the client from the therapist is neutral in nature, with the therapist understanding and yet also not endorsing or approving of the client's perspective (Miller & Rollnick, 2002). Miller and Rollnick (2002) theorize that acceptance facilitates

change, and that acceptance is demonstrated to the client through reflective listening. It is also important for the therapist to view ambivalence as normal.

Another key component to motivational interviewing is that of developing discrepancy. Motivational interviewing is a directive therapy, and the therapist is working to help the client realize that there are problems with their current behaviors that need to be confronted and changed. The therapist leads the client through resolving their ambivalence towards the targeted negative behavior and towards more positive behavior. The directive component of motivational interviewing works through the therapist amplifying the discrepancy between the client's current behavior and her or her goals and values. This is also done through the client's perspective, by focusing on the client's unhappiness with their current behavior, and also by focusing on the perceived advantages of changing their behavior. In all cases, the reason for change always comes from the client. The therapist's role is to help the client identify and clarify their goals and values that conflict with the current behavior. This must be accomplished without the client feeling pressured by the therapist (Miller & Rollnick, 2002).

The motivational interviewing principle of rolling with resistance refers to the tactic of not directly opposing resistance, but rather going with it. Resistance can be reframed slightly in such a way that it creates a new momentum towards change. Rolling with resistance also helps to keep decisions in the power of the client. The therapist reacts to resistance by inviting the client to consider new information. The therapist can also turn the problem back to the client in order to maintain his or her focus on problem

solving. Resistance can also be a sign to the therapist that they need to shift approaches (Miller & Rollnick, 2002).

The final principle of motivational interviewing is that of supporting self-efficacy. Self-efficacy is crucial in motivational interviewing, because even if the client strongly believes that they have a problem that needs changing, if they have no hope or confidence in their ability to change then they will not attempt the new behavior. The therapist can impact a client's self-efficacy through positive expectations about the client's chance of changing. As a general goal, the therapist should try to enhance the client's confidence in his or her ability to overcome obstacles and be successful in changing. Self-efficacy ties in very well with the premise that only the client can change the behavior, and that the client has the tools needed to be successful (Miller & Rollnick, 2002).

### *Motivational Interviewing and Health*

Research has shown that Motivational Interviewing has been found to be an effective intervention for changing health behaviors. For example, Dunn, Deroo, and Rivara (2001) reviewed several studies that used brief interventions adapted from motivational interviewing in order to change health-related behaviors. Studies were selected through searches of Medline, PsychInfo and Dissertation Abstracts International between the years 1983 and 1999, as well as searches of reference lists from review papers on brief substance abuse interventions. In order to be included in the review the studies had to meet the following criteria: (a) use motivational interviewing principles and techniques, (b) monitor the motivational interviewing sessions, (c) randomize participants to intervention and control/comparison conditions, (d) deliver the



motivational interview face-to-face, and (e) use measures of behavioral and/or health outcomes (Dunn et al., 2001).

A total of 29 studies met the criteria set forth by Dunn et al. (2001), with 26 of these providing enough information to determine effect size. A total of 17 of the 26 studies demonstrated effect sizes in favour of an intervention condition using motivational interviewing. The majority of the studies examined were treatments for substance abuse. Of these 15 studies, 10 demonstrated significant effect sizes for motivational interviewing, with effect sizes ranging from 0.30 to 0.95. Of the two studies on smoking, one of them had a significant effect size of 0.23. Of the four studies targeting HIV risk reduction, two of them had significant effect sizes of 0.46 and 0.64. Five studies addressed diet/exercise, three of which had significant effect sizes ranging from 0.36 to 2.17 (Dunn et al., 2001).

Burke, Arkowitz, and Menchola (2003) conducted a more recent meta-analysis of controlled clinical trials of motivational interviewing. Studies were selected for the meta-analysis through the reference lists of prior reviews of motivational interviewing, through PsycINFO, and the motivational interviewing website ([www.motivationalinterview.org](http://www.motivationalinterview.org)). Motivational interviewing trainers were also contacted regarding any published or unpublished studies on motivational interviewing (Burke et al., 2003). In order to be included in the review, the studies had to be a clinically-controlled trial that used motivational interviewing principles as the primary intervention (Burke et al., 2003). The studies included in the analysis targeting substance abuse found that 51% of the participants who received the motivational interview had either a noticeable improvement



or had achieved abstinence at post-treatment and follow-up assessments. They also found that the use of motivational interviewing instead of, or in addition to, treatment as usual for substance abuse improved success rates from one-third to one-half. On the other hand, Burke et al. (2003) found no support for the efficacy of motivational interviewing as a treatment for smoking or as a means of reducing HIV-risk behaviors.

The usefulness of motivational interviewing in regards to behavior change has been examined in two studies with participants recruited from African American church congregations in Atlanta, Georgia (Resnicow et al., 2001; Resnicow et al., 2005). The first of these studies examined the effects of motivational interviewing on fruit and vegetable intake (Resnicow et al., 2001). Members from 14 churches, matched by sociodemographic status were assigned to three treatment conditions: standard educational material on fruit and vegetable intake; culturally sensitive intervention with one telephone cue call; or culturally sensitive intervention with one cue call and three calls using motivational interviewing strategies. The mean age of the sample was 43.9 years, with a total of 861 participants completing the entire study including the one-year, follow-up assessment. Results for this study showed that participants in the group that received the motivational interview calls in addition to the culturally sensitive intervention reported the greatest increases in fruit and vegetable intake at one-year follow-up. There were no significant increases in either of the other two groups (Resnicow et al., 2001). These findings support the use of motivational interviewing as a method to aid in the increase of fruit and vegetable consumption.

The second study designed for use in African American churches involved an examination of the program “Healthy Body, Healthy Spirit” (Resnicow et al., 2005). Members from 16 churches participated ( $N=1056$ ) and were randomly assigned to one of three conditions: receiving standard information on nutrition and physical activity; receiving culturally targeted self-help materials on nutrition and physical activity; or receiving the culturally targeted materials and four telephone calls using motivational interviewing strategies. The motivational interviews were conducted by master’s-level and doctoral-level psychologists, and took place at weeks 4, 12, 26, and 40. Two of the motivational interviews targeted fruit and vegetable intake and two targeted physical activity (Resnicow et al., 2005). Results from this study found that the largest change in fruit and vegetable consumption occurred in the group receiving the combination of culturally-targeted material and the motivational interviews. This group’s increase was significantly greater than that found for the group receiving the standard information only, but not significantly different from the group receiving the culturally-targeted material by itself.

#### *Motivational Interviewing and Health with Older Adults*

Motivational Interviewing has also been utilized in interventions targeted towards older adults. The Healthy Aging Project was designed to examine the effectiveness of motivational interviewing conducted by nursing staff as a support to healthy behavior changes in older adults (Bennett et al., 2005). In this study 111 older adults were randomly assigned to either the motivational intervention or to a care-as-usual control group. Participants included only community-dwelling adults over the age of 60 years

that had been diagnosed with one or more of the following conditions: lung disease, heart disease, diabetes, neuromuscular disease, or arthritis. Participants in the intervention group had one face-to-face session with a nurse, lasting one hour, during which they chose which behavior they wanted to change, and received coaching as to the first steps to take towards changing the chosen behavior. The intervention group was followed for six months during which time they received their choice of telephone or email contact from the nurses trained in motivational interviewing. The telephone contact lasted between 10 and 15 minutes per session, with the average participant participating in seven sessions (Bennett et al., 2005).

Results from this study found that number of contacts by the nurses and changes in health status were not correlated. There were, however, significantly higher levels of health distress and illness in the control group compared to the intervention group after controlling for baseline characteristics. When different age groups were compared (60-74 years and 75-90 years), results demonstrated that younger participants in the intervention group had significantly lower levels of health distress, illness, and social/role activities limitations than younger participants in the control group. There were no differences between groups for the participants in the older-age group (Bennett et al., 2005). One limitation to this study was that participants chose which behaviors they wanted to change and these behaviors were not directly assessed by the researchers. Therefore, it was impossible to determine whether or not the motivational interview intervention was successful in changing the targeted behavior, or if another factor was responsible for the changes in health outcomes (Bennett et al., 2005).



Motivational Interviewing was added to a behavioral obesity treatment for older women with Non-Insulin Dependent Diabetes Mellitus (NIDDM) in order to determine whether or not it helped to enhance glucose control and adherence to the treatment (Smith, Kratt, Heckmeyer, & Mason, 1997). Participants for this study consisted of 22 women with NIDDM, who had a mean age of 62.4 years and an actual weight ranging from 120% to 200% of their ideal weight. The women were randomly assigned to either a standard 16-week, behavioral, weight-control program, or to the same behavioral program with three individualized motivational interview sessions. The results from this study found that the women in the motivational interviewing condition attended significantly more meetings than women in the other treatment group. The motivational interview group also recorded their blood glucose levels significantly more often, and completed significantly more food diaries than the standard treatment group. The women in the motivational interview condition also demonstrated significantly better glucose control at the post-treatment assessment than the women in the standard-treatment group. There were, however, no significant differences between the groups in regards to weight loss (Smith et al., 1997).

#### *Motivational Interviewing and Physical Activity*

Researchers have begun to adapt Motivational Interviewing as an intervention designed to increase levels of physical activity. In a review of the literature, Dunn et al. (2001) found that motivational interviewing typically showed increases in physical activity, and that these effects lasted up to three months. Dunn et al. (2001) also found that motivational interviewing worked best for increasing exercise if it was delivered over



six sessions as opposed to only one session. They also reported that studies of motivational interviewing and exercise generally showed small positive, but non-significant, effect sizes for increasing exercise in obese women and in coronary artery disease patients. Treatment adherence for weight loss was found to be increased in participants that received motivational interviews. Dunn and colleagues (2001) concluded that more research was needed regarding the use of motivational interviewing and physical activity before its efficacy could be determined.

The meta-analysis of controlled clinical trials of motivational interviewing conducted by Burke et al. (2003) also examined motivational interviewing and physical activity/exercise and found that motivational interviewing interventions were equivalent to other active treatments for improving diet and exercise, and were superior to placebo and no-treatment controls. Effect sizes for the use of motivational interviewing for diet and exercise tended to be in the mid range with an average effect size of 0.50, they were generally maintained at follow-up, but they were generally smaller in higher quality studies. However, with only four exercise/diet studies included in the meta-analysis, findings for this area should be viewed as preliminary (Burke et al., 2003).

In their trial of the *Healthy Body, Healthy Spirit* program, Resnicow et al. (2005) found that total minutes of physical activity increased significantly more for the groups with the culturally-targeted material and the culturally-targeted material plus the motivational interviews than for the group that received the standard information alone. There was no significant difference between the two conditions with the culturally targeted material. In discussing these results, Resnicow et al. (2005) pointed out that the

program they evaluated was designed to increase two health behaviors simultaneously making it difficult to determine the effectiveness of motivational interviewing for increasing physical activity. Results of this study found that of the participants that did make a behavioral change, 72% of them only made a change in one health behavior, and the majority of the participants in this study appeared to have a greater interest in changing their fruit and vegetable intake. The greater willingness to work on changing fruit and vegetable intake may have resulted in less effort being directed towards changing levels of physical activity (Resnicow et al., 2005).

A study conducted by Harland et al. (1999) examined different doses of motivational interviewing (one session versus six sessions), as well as the benefit of offering a financial incentive (incentive versus no incentive). Participants ( $N=734$ ) were recruited through a general medical practice and were between the ages of 40 to 64 years. Participants were randomized in blocks of ten, and were assessed at baseline, post-intervention, 12 weeks, and one year. Results of this study found that participants in all four intervention groups increased their levels of physical activity significantly more than did the participants in the control group. The group that received six motivational interview sessions plus vouchers (i.e. financial incentives) demonstrated the greatest increase in physical activity, but the differences between the four intervention groups were not statistically significant. The increases in physical activity, however, were not maintained at the one-year follow-up for any of the groups (Harland et al., 1999).

## Summary and Conclusions

The benefits of physical activity are numerous, and yet many adults in North America remain inactive. Physical activity is especially beneficial for older adults as it is a crucial component of remaining independent late in life, as well as reducing the likelihood of death from numerous diseases (Buchner et al., 2003). Despite these benefits the majority of this population remains inactive; in fact, older adults in Eastern Canada are the most inactive in the country (Kaplan et al, 2001). There is a need for health promotion programs, designed to increase physical activity, that are specifically tailored to community-dwelling, older adults.

The Transtheoretical Model, with its stages of change, has been found to be useful in understanding health behaviors. Stages of change has helped provide a clearer picture of how people adopt, increase, maintain, decrease, and even stop healthy behaviors. Moreover, it is especially useful by allowing researchers to determine whether or not participants in health promotion programs have benefited from the intervention even if they have not reached the ultimate goal of adopting the targeted behavior (Prochaska et al, 1992). The stages-of-change model has been used frequently in studies of physical activity interventions, with numerous reports of significant results in the use of stage-of-change-tailored interventions (Bock, et al. 2001). The stages-of-change model has also been found to be an accurate assessment of physical activity in older adults (Riebe, et al., 2005).

Evidence regarding the relationship between physical activity and self-efficacy and social support has been mixed with older adults (Marcus et al, 2002; Litt et al, 2002).



Although there is not a clear understanding of psychosocial mediators of physical activity, it is important to take these factors into consideration in any evaluation of physical activity interventions in order to gain a better picture of participant factors influencing the adoption of physical activity.

Motivational Interviewing has been shown to be a successful intervention in moving people towards the adoption of healthy behaviors, notably in the area of substance abuse (Burke et al, 2003). Recently motivational interviewing has begun to be used outside the realm of addiction and applied to the adoption of other behaviors. Motivational interviewing has been found to be a promising intervention for increasing levels of physical activity (Dunn et al, 2001). To date, the literature on motivational interviewing for increasing physical activity in older adults has largely been focused on older adults with specific diagnoses or problems, although a study conducted by Harland et al. (1999) focused on older adults in the community and demonstrated the promise of this intervention for this population.

In order to design and implement effective behavioral interventions for older adults dwelling in the community, it is crucial to gain a thorough understanding of potential moderators of physical activity for this population, such as stages of change, self-efficacy and social support. Further studies examining the use of motivational interviewing for encouraging adoption of physical activity are also needed, especially pertaining to older adults.

### The Current Study

The current study examined the use of motivational interviewing strategies for moving older adults forward along the stages of change towards higher levels of physical activity or towards better maintenance of physical activity.

Participants were randomly assigned to one of two groups. The first group consisted of a control group that received information regarding physical activity for older adults. The second group received the same information regarding physical activity for older adults, but also participated in four weekly sessions of motivational interviewing. The motivational interviews occurred individually and were conducted via the telephone. The motivational interviews were tailored to fit each participant's stage of change.

Each participant was assessed for demographic information, level of physical activity, stage of change for physical activity, self-efficacy for physical activity, and social support for physical activity. Data were collected at baseline, one month (post treatment) and six months (follow-up).

### Hypotheses

This study's first hypothesis was that the motivational interview would result in significant increases in the intervention group, relative to the control group, in moderate physical activity, self-efficacy for physical activity, and social support for physical activity after the intervention was completed. These improvements were expected to be maintained at post treatment and possibly at the six-month follow-up assessment.

The second hypothesis was that the motivational interview would result in significant increases in the intervention group, relative to the control group, for stage of change after the intervention was completed. These improvements were expected to be maintained at post-treatment and possibly at six-month follow-up.

The final hypothesis was that physical activity, stage of change, self-efficacy and social support scores/values at the baseline assessment would predict level of moderate physical activity at post-treatment and follow-up assessments.



## CHAPTER II

### METHOD

#### Participants

Participants were recruited from the Prince Edward Island Seniors Active Living Centre, as well as from the communities of Charlottetown and Stratford, Prince Edward Island, Canada. Recruitment methods included posters, flyers, and information sessions about the program at the Seniors Active Living Centre. All participants received educational information regarding physical activity for older adults in the form of Canada's Physical Activity Guide for Older Adults (2003; [http://www.cdc.gov/nccdphp/dnpa/physical/recommendations/older\\_adults.htm](http://www.cdc.gov/nccdphp/dnpa/physical/recommendations/older_adults.htm)).

Participants had to be at least 55 years of age and have an interest in increasing their level of physical activity. Interested participants were required to complete the Physical Activity Readiness Questionnaire (PAR-Q; see Appendix A) (Cardinal & Cardinal, 2000). Potential participants that answered "yes" to any of the questions on the PAR-Q were advised to consult with a physician before making any changes to their level of physical activity. Participants that answered "no" to all questions were advised to make any changes in their level of physical activity slowly, and to begin with goals of moderate levels of physical activity. The PAR-Q was developed to screen participants for health risks that could prevent them from participating in physical activity programs by the Canadian Society for Exercise Physiology, and has been widely used throughout North America and other regions (Cardinal & Cardinal, 2000). Although the

original PAR-Q was designed for use in adults up to age 69 years, Cardinal and Cardinal (2000) have reported that the PAR-Q generalizes well to adults over the age of 69.

Participants were excluded if they reported any physical conditions that limited their ability to increase their physical activity and exercise and did not have permission from their physician to increase their level of physical activity. Participants were also informed that anyone increasing physical activity levels should have a recent medical examination, and if it had been a year since their last medical examination they should obtain one before attempting to increase their physical activity and exercise.

A total of 86 participants (57 women and 29 men) were recruited and 43 were randomly assigned to each condition. Women ( $n=29$ ) in the motivational interview group (MI) had a mean age of 64.48 years ( $SD= 7.84$ ), while men ( $n=14$ ) in the MI group had a mean age of 64.79 years ( $SD= 7.71$ ). Women ( $n=28$ ) in the control group had a mean age of 67.86 years ( $SD= 7.68$ ), while the mean age for men ( $n=15$ ) in the control group sample was 64.47 years ( $SD=8.37$ ). All participants self-identified themselves as White ( $N = 86$ ). The mean Body Mass Index (BMI) for women in the control group sample was 26.22 ( $SD = 4.76$ ). The mean BMI for men in the control group sample was 27.40 ( $SD=3.45$ ). The mean BMI for women in the MI sample was 27.05 ( $SD= 6.43$ ). The mean BMI for men in the MI sample was 27.70 ( $SD= 4.16$ ). Other demographic information for this sample can be found in Tables 1, 2, and 3. Stage of change at baseline for men and women in the intervention and control groups can be found in Table 4.

Table 1. Income and Education Information for Participants at Baseline.

	Control Sample		MI Sample	
	Men	Women	Men	Women
	(n=15)	(n=28)	(n=14)	(n=29)
<b>Income satisfies needs:</b>				
Very Well	53.3%	57.1%	50%	44.8%
Adequately	40%	35.7%	35.7%	51.7%
Not Adequately	6.7%	7.2%	14.3%	3.4%
<b>Education:</b>				
Less than grade 12	6.7%	10.7%	7.1%	13.8%
High School Diploma	6.7%	7.1%	0%	13.8%
Some College	13.3%	42.9%	28.6%	41.4%
University Degree(s)	73.3%	39.3%	64.3%	31.0%

#### Materials

##### *Community Healthy Activities Model Program for Seniors Questionnaire (CHAMPS) modified*

Participants were assessed for current level of physical activity using a modified version of the CHAMPS questionnaire (see Appendix B). The modified version included all of the questions related to moderate levels of physical activity. The CHAMPS measure was developed to provide physical activity outcome measures for the Community Healthy Activities Model Program for Seniors intervention that was designed to increase physical activity behavior in older adults (Stewart, Mills, King, Haskell, Gillis, & Ritter, 2001). The CHAMPS questionnaire was designed to focus on exercise,



routine physical activity, and recreational activities that are common among older adults (Stewart et al., 2001).

Table 2. Living Situation for Participants at Baseline.

	<b>Control Sample</b>		<b>MI Sample</b>	
	Men	Women	Men	Women
	(n=15)	(n=28)	(n=14)	(n=29)
<b>Living Situation:</b>				
Living Alone	6.7%	32.1%	3.6%	20.7%
Living with Spouse	93.3%	64.3%	92.9%	75.9%
Living with Another Adult	0%	3.6%	0%	3.4%
<b>Number of Children in Household:</b>				
None	66.7%	89.3%	71.4%	93.1%
One	20.0%	10.7%	28.6%	6.9%
Two or Three	13.3%	0%	0%	0%

The CHAMPS questionnaire estimates weekly frequency of physical activity, taking into account that older adults are less likely to participate in physical activity on a regular schedule. The CHAMPS questionnaire also estimates caloric expenditure per week in moderate-intensity exercise-related activities. Caloric expenditure is calculated by creating duration variables that represent hours per week for each activity. The duration variable is then weighted by multiplying it by the corresponding MET value in order to account for different intensities of various activities. The weighted value is

multiplied by 3.5 and then by 60 in order to convert the METs per second to METs per hour. The METs per hour value is then multiplied by weight in kilograms divided by 200 which results in caloric expenditure per week for each activity. The caloric expenditures per week for each activity are then summed to provide the total caloric expenditure per week (Stewart et al., 2001).

Table 3. Health Issues for Participants at Baseline.

	<b>Control Sample</b>		<b>MI Sample</b>	
	Men	Women	Men	Women
	(n=15)	(n=28)	(n=14)	(n=29)
<b>Description of Health:</b>				
Excellent	20%	32.1%	0%	34.5%
Very Good	46.7%	35.7%	78.6%	48.3%
Good	20%	10.7%	21.4%	6.9%
Fair	13.3%	21.4%	0%	10.3%
<b>Health status<sup>1</sup>:</b>				
Better	13.3%	28.6%	7.1%	20.7%
Same	73.3%	53.6%	85.7%	69.0%
Somewhat worse	13.3%	17.9%	7.1%	10.3%
<b>Smoking Status:</b>				
Yes	13.3%	7.1%	0%	3.4%
No	86.7%	92.9%	100%	96.6%

<sup>1</sup> Health status compared to one year ago

Table 4. Stage of Change by Group at Baseline.

	Control Sample		MI Sample	
	Men	Women	Men	Women
	(n=15)	(n=28)	(n=14)	(n=29)
<b>Stage of Change:</b>				
Precontemplation	3	1	1	0
Contemplation	2	1	2	4
Preparation	0	4	2	5
Action	0	4	0	3
Maintenance	10	18	9	17

The CHAMPS questionnaire was designed to ameliorate accurate responding in a population that may have higher incidence of memory difficulties, by providing a list of physical activities and thereby making use of recognition memory rather than recall memory (Stewart et al., 2001). CHAMPS was also designed to account for sensory problems that often occur in older adults by having questions in large font, with high contrast and lines across the page to aid in tracking for self-administration. CHAMPS is also easy to administer over the phone for people with visual impairments (Stewart et al., 2001).

CHAMPS is sensitive to changes in physical activity, as it assesses both lower and higher intensity activities, and it detects changes in exercise, even if the changes are not enough to categorize the person as being physically active. This sensitivity is important in that it can help to determine whether or not an intervention has been



successful in moving a person in the right direction, even if s/he does not meet criteria for a physically active person (Stewart et al., 2001).

Harada, Chiu, King, and Stewart (2001) conducted a study comparing the CHAMPS measure of physical activity and two other self-report instruments for older adults in order to examine validity and reliability. The CHAMPS questionnaire responses were compared to activity monitoring for one week (using a Mini-Logger Series 2000), a short physical performance battery (consisted of assessing balance, walking and lower body strength), a six-minute walk (with participants being told to go as far as possible during six minutes), and body mass index. Known groups validity was demonstrated for CHAMPS in that participants recruited from community centers had significantly higher levels of physical activity than participants recruited from retirement homes. Construct validity was confirmed with correlations between scores on CHAMPS and counts on the Mini-Logger (0.42-0.61). Scores on CHAMPS were also correlated with the performance based assessment (0.44-0.68); however, body mass index was not found to be correlated with CHAMPS scores (Harada et al., 2001).

The reliability of CHAMPS was also assessed by having participants complete the measure again two weeks later. The reliability for “all” physical activities was 0.62, while the reliability for moderate physical activity was 0.76 (Harada et al., 2001).

#### *Exercise: Stage of Change: Short Form*

Participants were assessed for stage of change for physical activity using the *Exercise: Stage of Change-Short Form Measure* (see Appendix C). This measure was developed by Marcus, Selby, Niaura and Rossi (1992). The measure provides a definition for being regularly active, and then asks if the participants are currently active according

to the definition. Participants have five options to choose from including both “yes” and “no” responses, plus options for describing how long they have been active, or whether or not they intend on becoming physically active within a certain time frame. The kappa index of reliability for the stages of change measure over two weeks was 0.78 (Marcus et al., 1992).

#### *Exercise: Self Efficacy*

Participants were also assessed for level of exercise self-efficacy using the *Exercise: Self Efficacy Measure* (see Appendix D). This measure was developed by Marcus et al., (1992). This measure consists of six questions, which are all rated on a five-point scale for level of confidence (not at all confident to completely confident) in being able to exercise when the situation occurs. The internal consistency of this measure was 0.82. The test-retest reliability for this measure over two weeks was 0.90 (Marcus et al., 1992).

#### *Social Support*

Participants were assessed for social support for both family and friends through two questions designed for use in this study. These questions ask the participants to rate the amount of support and encouragement they receive from family and friends for physical activity. Participants were asked to rate social support on a scale of 0 to 10, with 0 being not at all, and 10 being total support (see Appendix E). These two questions are modified versions of the questions from the Campbell Survey on Well Being in Canada (1988) that addressed social support for physical activity from family and friends. The questions were condensed to cover family in general and friends in general, rather than

specific people, for the sake of brevity and also to coincide with other measures of social support (Sallis, Grossman, Pinski, Patterson & Nader, 1987).

#### *Canada's Physical Activity Guide to Healthy Active Living for Older Adults*

All participants were provided with a copy of Canada's Physical Activity Guide to Healthy Active Living for Older Adults at baseline (see Appendix F). The guide was developed conjointly by the Public Health Agency of Canada, the Active Living Coalition for Older Adults, and the Canadian Society for Exercise Physiology. The guide was designed to promote physical activity in older adults, and includes information on the benefits of physical activity, tips for increasing and maintaining physical activity, recommended levels of physical activity, examples of activities, and stories of older adults who became active (Canada's Physical Activity Guide for Older Adults).

#### *Motivational Interview*

Four motivational interviews were conducted with 43 randomly chosen participants. The motivational interviews followed the four core principles of the technique, and covered information regarding participants' current level of physical activity, confidence in being physically active, perceived importance of physical activity, their ideas and interests in different types of physical activity, individual barriers to physical activity, problem solving and encouragement.

Data was collected from each motivational interview rating the participant's level of physical activity, interest in increasing level of physical activity, and confidence in ability to increase level of physical activity. Level of physical activity was assessed by asking the participants the number of days in the previous week that they were physically active. They were then asked to provide the average amount of time they spent doing



physical activity during the sessions in the previous week. Level of physical activity was calculated by multiplying the average length of sessions in hours by the number of sessions. Interest in physical activity was assessed by asking the participants to rate on a scale of 0 to 10 how interested they were in increasing their level of physical activity, with 10 being the most interested. Confidence in physical activity was assessed by asking the participants to rate on a scale of 0 to 10 how confident they were that they could increase their level of physical activity, with 10 being completely confident. The motivational interviews were conducted by the author, who is a Ph.D. student in Clinical Psychology. The author has had previous workshop training and experience in conducting motivational interviews.

#### Procedures

Potential participants were recruited through the Prince Edward Island Seniors Active Living Centre, and also through the communities of Charlottetown and Stratford. Participants were invited to participate if they indicated an interest in taking part and if they did not answer “yes” to any of the questions on the PAR-Q. The researchers contacted eligible participants by phone and invited them to participate. Interested participants met in the Seniors Active Living Centre or at the University of Prince Edward Island individually to complete the assessment battery (Exercise: Stages of Change: Short Form, Exercise: Self Efficacy, and CHAMPS - modified version; and Social Support). Consent was obtained at this time. Participants were informed about the assessment battery, and asked to complete it at that time as well as post-treatment (four to six weeks later), and at six-month follow-up. They were also informed that they may be selected to participate in four weekly telephone motivational interview sessions to discuss

physical activity. All participants received a \$10 Canadian gift certificate to a local grocery store at the end of the study.

All participants were given Canada's Physical Activity Guide to Healthy Active Living for Older Adults (2003; see Appendix F). Canada's Physical Activity Guide to Healthy Active Living for Older Adults was provided to participants so they would have the necessary knowledge and strategic resources for increasing their physical activity levels in an appropriate manner. Finally, participants were informed in writing that anyone increasing physical activity levels should have had a recent medical examination. Researchers informed participants who had not had an exam for over a year to consult with a health practitioner. At this point 43 participants were randomly selected to participate in the four motivational interview sessions related to their physical activity behavior. All participants were reminded that they would be contacted to set up their next appointment for the follow-up assessment.

Participants selected for the motivational interview condition were contacted by phone weekly for four weeks. The motivational interviews consisted of questions regarding weekly success with goals for physical activity, number of sessions of physical activity, total time spent doing physical activity, and confidence and motivation for being physically active. During these sessions barriers to physical activity were addressed and participants were encouraged to commit to goals for the coming week for physical activity.

All participants were reassessed four weeks after the first assessment. This time frame should have provided sufficient time to move from the preparation stage to the action stage, given that the preparation stage is defined as actively planning on the



behavior change some time in the next 30 days. Next, participants were re-evaluated to determine whether there was a change in physical activity behavior (CHAMPS -modified version), movement along the stages of change (Exercise: Stages of Change: Short Form), self-efficacy (Exercise: Self Efficacy Measure), and social support. Participants then had the option of providing their mailing address for a hard copy of the results of the study.

All participants were re-evaluated at six month follow-up to determine if any effects of treatment were maintained in the long term. Participants were again assessed for physical activity behavior (CHAMPS -modified version), movement along the stages of change (Exercise: Stages of Change: Short Form), self-efficacy (Exercise: Self Efficacy Measure), and social support. All participants were mailed a \$10 gift certificate for a local grocery store after all of the data had been collected.

#### Analytic Plan

The effects of the Motivational Interview were examined by comparing the intervention group to the control group in six, mixed design ANOVAs for physical activity, self-efficacy, stage of change, and social support across baseline, post-treatment and six-month follow-up assessment. When significant interactions were found, test of simple effects were used to follow up interactions. All F tests associated with repeated measures were adjusted for sphericity by using Greenhouse-Geisser epsilon estimates. The independent variable for these analyses was the motivational interview. Dependent variables included: frequency of physical activity, weekly caloric expenditure from physical activity, self-efficacy for physical activity, social support for physical activity, and stage of change for physical activity.



Eight predictive multiple regression analyses were used to examine the utility of stage of change, self-efficacy, and friend and family social support at baseline as predictors of physical activity frequency and weekly caloric expenditure from physical activity time at post-treatment and six-month follow-up.

Finally, within-subject analyses were conducted to determine whether there were changes in total time spent doing physical activity, confidence and interest/motivation for physical activity within the participants in the Motivational Interview condition across the four weeks of the intervention. All F tests associated with repeated measures were adjusted for sphericity by using Greenhouse-Geisser epsilon estimates.

## CHAPTER III

### RESULTS

#### Analyses Examining Group Treatment Effects

##### *Weekly Caloric Expenditure from Physical Activity*

Physical activity was evaluated by calculating the estimated caloric expenditure per week from physical activity as per the CHAMPS questionnaire responses. The caloric expenditure per week represents the energy expended in physical activities including sports, exercise, and lifestyle physical activity (Resnicow et al., 2003). Log 10 transformations of the weekly caloric expenditure variables at baseline, post-treatment, and six-month follow-up were used because of the extreme range of scores and positively skewed original distributions. A 2 (Treatment Condition) X 3 (Assessment) mixed design ANOVA examining total weekly caloric expenditure through physical activity indicated that there was a statistically significant main effect of Assessment [ $F(1.84, 146.78) = 29.23, p < .001; \eta^2 = .268$ ]. The main effect for group was not significant [ $F(1,80) = 0.99, p > .05; \eta^2 = .012$ ]. There was a significant interaction of Treatment Condition by Assessment [ $F(1.84, 146.78) = 3.842, p < .05; \eta^2 = .046$ ].

Tests of simple effects were used to follow-up the significant two-way interaction (see figure 1) revealing that the motivational interviewing and control groups were significantly different only at post-assessment [ $t(83) = 2.22, p < .05; \kappa = .42$ ]. Tests of simple effects were also significant across assessments in both the treatment condition [ $F(1.61, 66.11) = 18.74, p < .001; \eta^2 = .31$ ] and the control group [ $F(1.98, 77.08) = 14.36,$

$p < .001$ ;  $\eta^2 = .27$ ]. Participants in the treatment condition showed significant increases in weekly caloric expenditure from baseline to post-assessment [ $t(42) = 4.39, p < .001$ ;  $\kappa = .57$ ], and significant decreases in weekly caloric expenditure from post-assessment to six-month follow-up [ $t(41) = 7.06, p < .001$ ;  $\kappa = .94$ ]. Participants in the control condition showed significant decreases in weekly caloric expenditure from baseline to six-month follow-up [ $t(40) = 4.59, p < .001$ ;  $\kappa = .55$ ], and from post-assessment to six-month follow-up [ $t(40) = 5.85, p < .001$ ;  $\kappa = .51$ ].

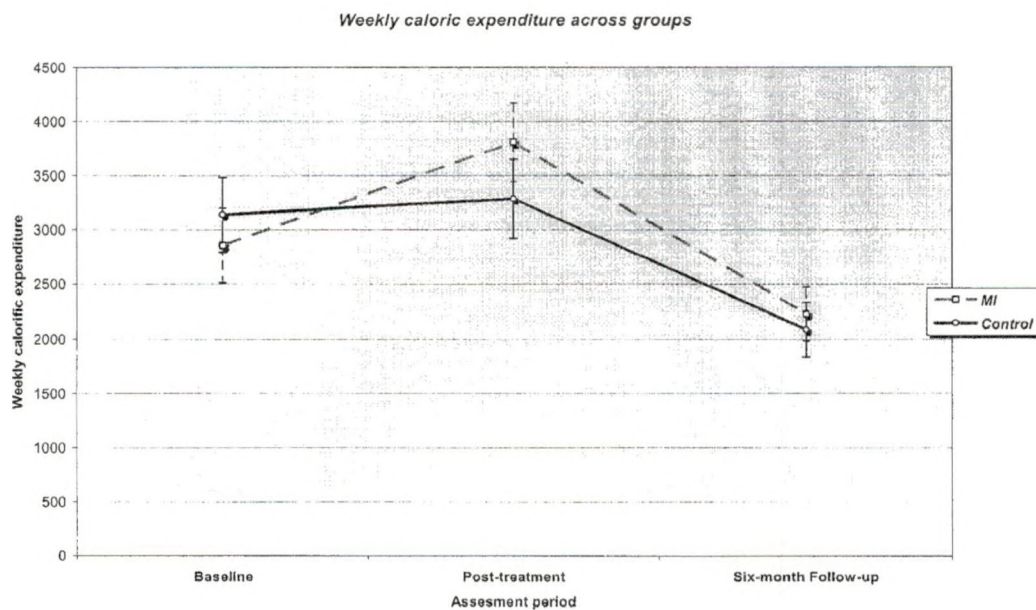


Figure 1. Weekly Caloric Expenditure Across Groups and Assessments.<sup>2</sup>

#### *Physical Activity Frequency per Week*

Physical activity frequency was assessed by number of sessions of physical activity, including sports, exercise, and lifestyle activity, per week as reported on CHAMPS. A 2 (Treatment Condition) X 3 (Assessment) mixed design ANOVA

<sup>2</sup> Analyses of weekly caloric expenditure were done following log10 transformations.



examining weekly frequency of physical activity indicated that there was a statistically significant main effect of Assessment [ $F(1.99, 161.19) = 125.21, p < .01; \eta^2 = .083$ ]. The main effect for group was not significant [ $F(1,81) = 1.63, p > .05; \eta^2 = .020$ ]. The interaction of Treatment Condition by Assessment was statistically significant [ $F(1.99, 161.19) = 58.90, p < .05; \eta^2 = .041$ ].

Tests of simple effects were used to follow-up the significant two-way interaction (see figure 2) revealing that the motivational interviewing and control groups were significantly different only at post-assessment [ $t(84) = 2.3, p < .05; \kappa = .50$ ]. Tests of simple effects were also significant across assessments in both the treatment condition [ $F(1.93, 78.91) = 6.02, p < .01; \eta^2 = .13$ ] and the control group [ $F(1.98, 79.20) = 4.72, p < .01; \eta^2 = .11$ ]. Participants in the treatment condition showed significant increases in frequency of physical activity from baseline to post-assessment [ $t(42) = 3.66, p < .01; \kappa = .44$ ] and significant decreases in frequency of physical activity from post-assessment to six-month follow-up [ $t(41) = 2.84, p < .01; \kappa = .43$ ]. Participants in the control condition showed significant decreases in frequency of physical activity from baseline to six-month follow-up [ $t(40) = 2.81, p < .01; \kappa = .33$ ], and from post-assessment to six-month follow-up [ $t(40) = 2.61, p < .01; \kappa = .30$ ].

#### *Self-Efficacy for Physical Activity*

A 2 (Treatment Condition) X 3 (Assessment) mixed design ANOVA examining self-efficacy for physical activity indicated that there was not a statistically significant main effect [ $F(1.96, 158.89) = 0.96, p > .05; \eta^2 = .012$ ]. The main effect for group was significant [ $F(1,81) = 4.00, p < .05; \eta^2 = .047$ ], with participants in the motivational interview condition reporting significantly higher levels of self-efficacy overall across all

three assessments ( $M = 21.99, SD = 4.34$ ) than the participants in the control condition ( $M = 20.15, SD = 5.12$ ). The interaction of Treatment Condition by Assessment was not significant [ $F(1.96, 158.89) = 1.02, p > .05; \eta^2 = .012$ ].

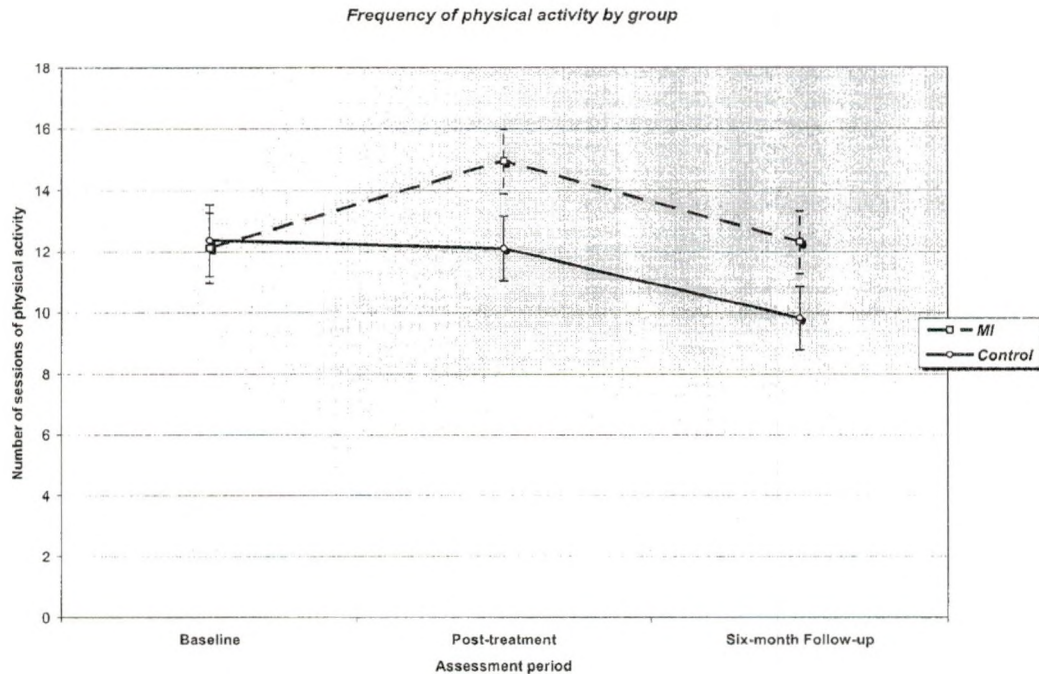


Figure 2. Frequency of Physical Activity Sessions per Week Across Assessment Period and Group.

#### *Social Support for Physical Activity*

A 2 (Treatment Condition) X 3 (Assessment) mixed design ANOVA examining family social support indicated that there was not a significant main effect for assessment [ $F(1.67, 135.45) = 2.07, p > .05; \eta^2 = .025$ ], a significant main effect for group [ $F(1,81) = 1.93, p > .05; \eta^2 = .023$ ], or a statistically significant interaction of Treatment Condition by Assessment [ $F(1.67, 135.45) = 0.90, p > .05; \eta^2 = .011$ ].

A 2 (Treatment Condition) X 3 (Assessment) mixed design ANOVA examining friend social support indicated that there was not a significant main effect for assessment [ $F(1.97, 159.42) = 1.69, p > .05; \eta^2 = .020$ ], a significant main effect for group [ $F(1,81) = 0.02, p > .05; \eta^2 = .000$ ], or a statistically significant interaction of Treatment Condition by Assessment [ $F(1.97, 159.42) = 0.14, p > .05; \eta^2 = .002$ ].

#### *Stage of Change*

A 2 (Treatment Condition) X 3 (Assessment) mixed design ANOVA examining stage of change indicated that there was a statistically significant main effect of Assessment [ $F(1.77, 143.21) = 3.97, p < .05; \eta^2 = .047$ ]. The main effect for group was not significant [ $F(1,81) = 1.18, p > .05; \eta^2 = .014$ ]. The interaction of Treatment Condition by Assessment was also statistically significant [ $F(1.83, 147.97) = 3.16, p < .05; \eta^2 = .038$ ]. Tests of simple effects showed no significant group differences at any of the three assessments; however, they did show significant differences across assessments in the treatment condition [ $F(1.73, 70.97) = 6.23, p < .01; \eta^2 = .132$ ], but not the control condition [ $F(1.73, 69.02) = 1.16, p > .05; \eta^2 = .028$ ]. Participants in the treatment condition showed significant increases in stage of change from baseline to post-assessment [ $t(42) = 3.59, p < .01; \kappa = .52$ ], and from baseline to six-month follow-up [ $t(41) = 2.11, p < .05; \kappa = .33$ ] (see figure 3).



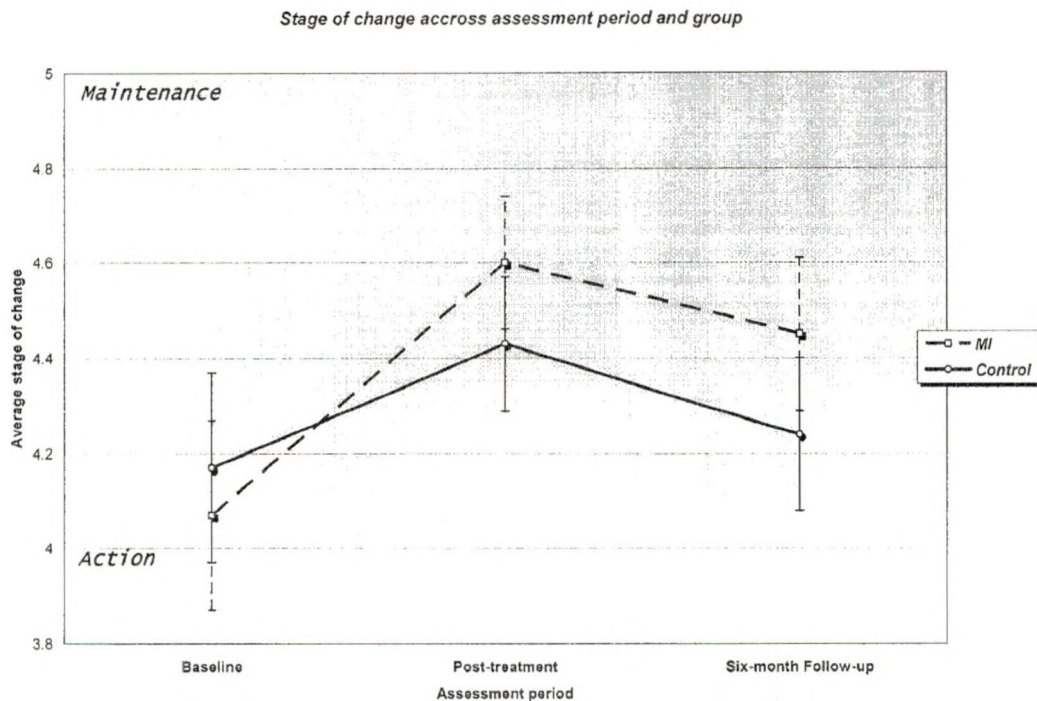


Figure 3. Average Stage of Change Across Assessment Period and Group.

#### Prediction of Physical Activity at Post and Follow-up Assessments

Multiple regression analyses were used to examine the importance of stage of change, self-efficacy, and friend and family social support in predicting physical activity frequency and weekly caloric expenditure from physical activity at post-treatment and six-month follow up assessment.

#### *Predictors of Physical Activity at Post-treatment*

Two multiple regression analyses were conducted to examine the importance of stage of change, self-efficacy for physical activity, and social support at baseline in predicting weekly caloric expenditure from physical activity and weekly time spent in physical activity at post-treatment.

The regression model predicting weekly frequency of physical activity accounted for a statistically significant [ $F(4,85) = 6.01, p < .01$ ] amount of variance ( $R = .478$ ;  $R^2 = .229$ ). Stage of change ( $\beta = .306$ ;  $t = 2.76, p < .01$ ) and self-efficacy for physical activity ( $\beta = .318$ ;  $t = 2.82, p < .01$ ) at baseline accounted for significant amounts of variance in weekly frequency of physical activity at post-treatment. Next, the weekly frequency of physical activity at baseline was added as a predictor. This revised model was also statistically significant [ $F(5, 85) = 13.09, p < .01$ ]; however, the only significant predictor was weekly frequency of physical activity at baseline ( $\beta = .602$ ;  $t = 5.67, p < .01$ ). Stage of change and self-efficacy at baseline were no longer significant predictors.

The regression model predicting weekly caloric expenditure from physical activity at post-treatment also accounted for a statistically significant [ $F(4,84) = 4.57, p < .01$ ] amount of variance ( $R = .431$ ;  $R^2 = .186$ ). As in the first regression model, stage of change ( $\beta = .249$ ;  $t = 2.17, p < .05$ ) and self-efficacy for physical activity ( $\beta = .302$ ;  $t = 2.59, p < .05$ ) were significant predictors in this model. Next, the weekly caloric expenditure from physical activity at baseline was added as a predictor. This revised model was statistically significant [ $F(5, 84) = 12.26, p < .01$ ], and the significant predictors were self-efficacy for physical activity ( $\beta = .221$ ;  $t = 2.25, p < .05$ ), and weekly caloric expenditure from physical activity at baseline ( $\beta = .540$ ;  $t = 5.94, p < .01$ ). Stage of change at baseline was no longer a significant predictor.

#### *Predictors of Physical Activity at Six-Month Follow-up*

Further multiple regressions were conducted to examine the importance of stage of change, self-efficacy for physical activity, and social support data at baseline in predicting physical activity at six-month follow-up.

The regression model predicting weekly frequency of physical activity at six-month follow-up accounted for a statistically significant [ $F(4,82) = 5.92, p < .01$ ] amount of variance ( $R = .483; R^2 = .233$ ). The only significant predictor in this model was self-efficacy at baseline ( $\beta = .400; t = 3.49, p < .01$ ). Next, the weekly frequency of physical activity at baseline was added as a predictor. This revised model was statistically significant [ $F(5, 82) = 11.47, p < .01$ ], and the only significant predictor was weekly frequency of physical activity at baseline ( $\beta = .562; t = 5.11, p < .01$ ). Self-efficacy at baseline was no longer a statistically significant predictor.

The regression model examining baseline predictors of weekly caloric expenditure from physical activity at six-month follow-up also accounted for a statistically significant [ $F(4,82) = 5.37, p < .01$ ] amount of variance ( $R = .465; R^2 = .216$ ). As in the above regression, the only significant predictor in the model was self-efficacy at baseline ( $\beta = .337; t = 2.91, p < .01$ ). Next, the weekly caloric expenditure from physical activity at baseline was added as a predictor. This revised model was statistically significant [ $F(5, 82) = 9.24, p < .01$ ], and the significant predictors were self-efficacy for physical activity ( $\beta = .284; t = 2.71, p < .01$ ) and weekly caloric expenditure from physical activity at baseline ( $\beta = .451; t = 4.43, p < .01$ ).

#### Analyses within the Motivational Interviewing Condition

Participants in the Motivational Interview condition provided weekly data for four weeks as a component of their motivational interviews. Data included rating their total time spent doing physical activity in the past week, their interest/motivation in increasing their level of physical activity, and their confidence in being able to reach their physical activity goals. Within-subjects repeated measure analyses were used to examine changes



in these measures across the four week intervention period. Multiple regression analyses were also conducted in order to examine the utility of using interest/motivation and confidence ratings in preceding weeks for predicting actual time spent doing physical activity in subsequent weeks.

#### *Weekly Physical Activity Changes*

A one-way repeated measures ANOVA was conducted to examine changes in physical activity at the four weekly assessments associated with the motivational interview sessions. Results from this analysis failed to yield a significant effect for physical activity across the weekly sessions [ $F(2.02,84.95)=1.30, p=.278$ ].

#### *Weekly Confidence Changes*

A one-way repeated measures ANOVA was conducted to examine changes in confidence levels for reaching desired levels of physical activity at the four weekly assessments associated with the motivational interview sessions. Results from this analysis yielded a statistically significant effect for confidence levels across the weekly sessions [ $F(2.17,91.07)= 4.28, p<.05$ ]. Correlated t-tests were used as post hoc, follow-up tests for this main effect. These tests revealed pairwise differences between the first week and the third week [ $t(42)= 2.49, p<.05$ ], first and the fourth week [ $t(42)= 2.49, p<.05$ ], and second week and the third week [ $t(42)= 2.07, p<.05$ ] (See Figure 4).

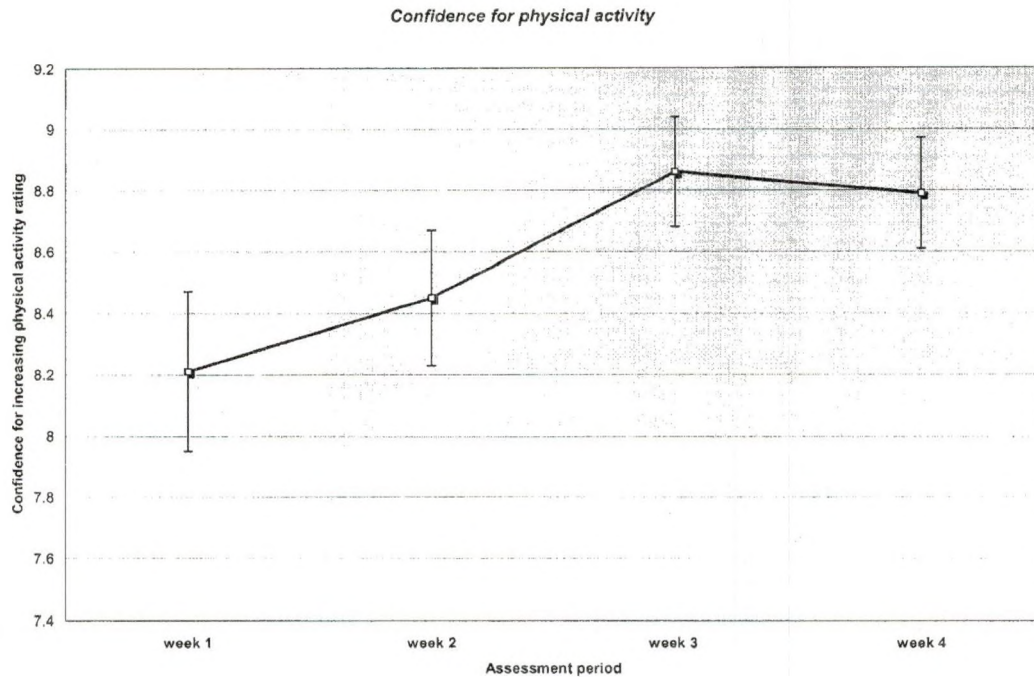


Figure 4. Level of Confidence for Reaching Desired Level of Physical Activity within Motivational Interview Condition.

#### *Weekly Interest/Motivation Changes*

A one-way repeated measures ANOVA was conducted to examine changes in interest levels for reaching desired levels of physical activity at the four weekly assessments associated with the motivational interview sessions. Results from this analysis yielded a statistically significant effect for interest levels across the weekly sessions [ $F(1.91, 80.17) = 6.29, p < .01$ ]. Correlated t-tests were used as post hoc, follow-up tests for this main effect. These tests revealed pairwise differences between the first week and the third week [ $t(42) = 2.44, p < .05$ ], first and the fourth week [ $t(42) = 3.11, p < .05$ ], the second week and the fourth week [ $t(42) = 2.90, p < .05$ ], and the third and the fourth week [ $t(42) = 2.72, p < .05$ ]. (See Figure 5).

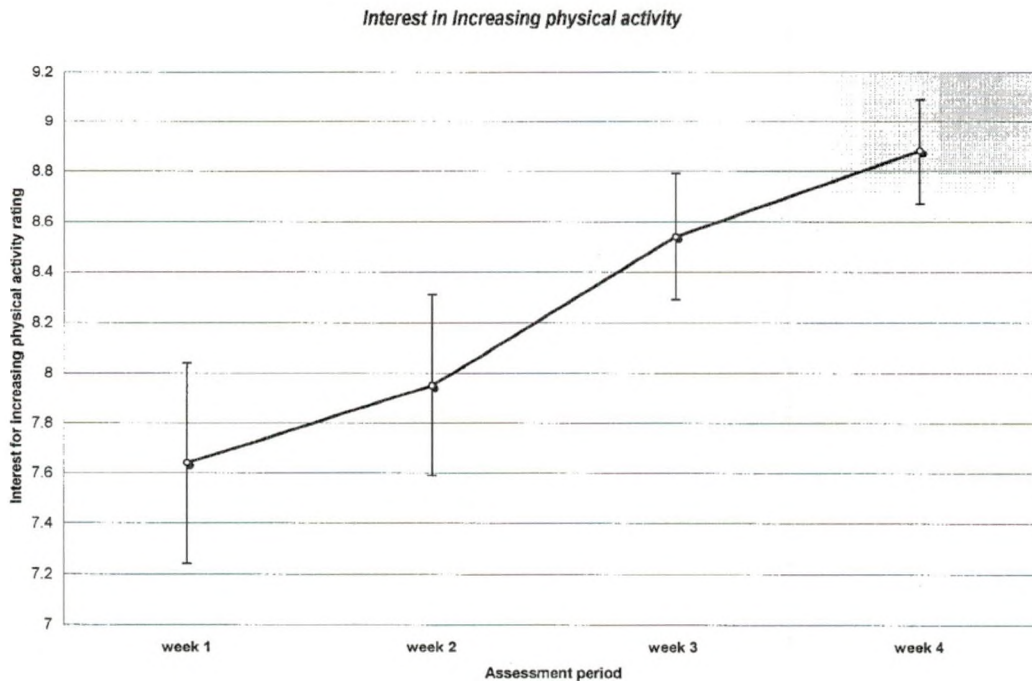


Figure 5. Interest in Increasing Physical Activity across Assessments within Motivational Interview Condition.

#### *Prospective Prediction of Weekly Physical Activity Measures*

Multiple regression analyses were used to examine the importance of interest/motivation confidence ratings in predicting total time spent doing physical activity. In the first multiple regression interest/motivation and confidence ratings in the first week entered into the model to predict level of physical activity in the second week. This model ( $R = .26$ ;  $R^2 = .065$ ) was not statistically significant [ $F(2,42) = 1.39, p > .05$ ]. In the second multiple regression interest/motivation and confidence ratings in the second week were entered into the model to predict level of physical activity in the third week. This model ( $R = .07$ ;  $R^2 = .006$ ) also was not statistically significant [ $F(2,42) = .11, p > .05$ ]. In the third multiple regression interest/motivation and confidence ratings in the third week were entered into the model to predict level of physical activity in the



fourth week. This model ( $R = .39$ ;  $R^2 = .16$ ) was statistically significant [ $F(2,42) = 3.66$ ,  $p < .05$ ], with confidence ratings in the third week being a significant predictor of physical activity in the fourth week ( $\beta = .472$ ;  $t = 2.70$ ,  $p < .01$ ).

## CHAPTER IV

### DISCUSSION

#### Effects of the Motivational Interview

The current study's primary objective was to examine the effects of a four session motivational-interviewing intervention on physical activity (weekly caloric expenditure and frequency), stage of change for physical activity, self-efficacy for physical activity and social support for physical activity in older adults. Secondly, regressions were used to examine whether physical activity levels at post-treatment and/or at follow-up could be predicted using baseline measures of stages of change, self-efficacy, and social support. Finally, for participants in the motivational interviewing intervention, changes across the four weekly sessions were examined.

#### *Physical Activity*

Results examining changes in participants' weekly caloric expenditure from physical activity demonstrated that there was a statistically significant interaction between the treatment condition and weekly physical activity levels, with participants in the Motivational Interviewing condition demonstrating significant increases from baseline to post treatment in weekly caloric expenditure from physical activity, while the control group had no change (see figure 1). These findings indicate that the intervention was successful in increasing physical activity in older adults; however, the increases in physical activity were not maintained at the six-month follow-up. Participants in both

conditions reported significant decreases in weekly caloric expenditure from physical activity at six-month follow-up compared to post-treatment, however, only participants in the control group demonstrated significant decreases in weekly caloric expenditure from baseline to six-month follow-up. These results demonstrate that the relapse was not as great for the intervention group as it was for the control group (see figure 1). Although findings of relapse toward inactivity are common in similar studies (Marcus & Forsyth, 2003), the findings in the present study may have particularly been influenced by the change in seasons. The six-month follow-up data were collected in the middle of the winter during which time cold temperatures, ice, and snow likely led to lower levels of physical activity in all participants. This is especially relevant to older adults who are likely to identify fear of falling as a barrier to physical activity (Lees, Clark, Nigg, & Newman, 2005).

This study found similar results when differences in the weekly frequency of physical activity were examined: participants in the intervention condition reported significantly higher numbers of physical activity sessions at post treatment than participants in the control condition. Measuring frequency of physical activity becomes important in understanding small changes to lifestyles that have been made, as even 10 minute sessions of physical activity have been shown to have health benefits when done frequently (CDC, 2002). Small physical activity lifestyle changes are often an easier way to integrate more physical activity than taking larger steps associated with participation in a regular sport or extensive workout. At baseline, participants in both conditions reported an average of 12 sessions of physical activity per week, but those in the intervention condition increased this to an average of 15 sessions of physical activity per week, while



those in the control condition reported no change. As with weekly caloric expenditure, participants in the intervention group reported significantly lower frequency of physical activity at 6 month follow-up compared to post-assessment, suggesting a relapse of gains made during the intervention. Frequency of physical activity from baseline to six-month follow-up decreased significantly for the control group. The decrease in frequency of physical activity for both groups was likely due to the changes in seasons (Lees et al., 2005), as the follow-up data was collected in the middle of the winter in contrast to the baseline and post-treatment data being collected in the summer.

These findings support results reported by Harland et al. (1999) who found that participants receiving a motivational interview intervention increased their level of physical activity significantly more than participants in a control group in the short term. Harland et al. (1999) also found that these results were not maintained at 12 months after baseline. These results suggest the possible need for booster sessions as a way to maintain results over the long term, as is recommended by Hettema, Steele, and Miller (2005) in their meta-analysis on the effectiveness of Motivational Interviewing.

The results of the current study also support the findings in the meta-analyses conducted by Burke et al. (2003) and Dunn et al. (2001) examining motivational interviewing. Both of these authors found support for motivational interviewing as an effective intervention for increasing levels of physical activity. It should be noted that the studies included in the meta-analyses conducted by Burke et al. (2003) and Dunn et al. (2001) only examined short-term follow-up data (less than 4 months).

Despite the finding that the impact of the intervention was not maintained at the six-month follow-up, this study demonstrates that motivational interviewing administered

through four, brief, telephone sessions is an effective method of increasing levels of physical activity in a community sample of older adults. It is also important to note that people who have been physically active are more likely to be physically active again in the future, despite going through periods of inactivity (Prochaska & DiClemente, 1992), demonstrating the potential for long-term benefits of the intervention, despite the relapse to previous levels at the six-month follow-up. These findings hold promise for the use of motivational interviewing for physical activity levels in older adults as a cost effective intervention that is able to reach a wider range of older adults due to the phone administration component of the motivational interviews.

The results of the current study are especially promising when compared to the outcomes of CHAMPS II, a physical activity promotion program for older adults conducted by Stewart et al. (2001). The CHAMPS II study demonstrated similar increases in levels of physical activity through a much more intensive program that included principles of self-efficacy enhancement, readiness to change and motivational techniques. The participants in the CHAMPS II intervention were followed for 1 year and treatment consisted of informational meetings, individual planning sessions, monthly group workshops, physical activity diaries, regular staff-initiated telephone calls from a counsellor, monthly newsletters, and functional fitness assessments. Post-intervention results were not reported for the CHAMPS II program (Stewart et al., 2001). The current study suggests that a much less intensive program can achieve similar increases in levels of physical activity in older adults, although booster sessions, as recommended by Hettema et al. (2005), may be needed to maintain these results.



The finding that four, brief, telephone motivational interviews had an impact on physical activity levels in older adults holds promise for the utility of this convenient and inexpensive treatment. It should be noted, however, that reports of physical activity in the sample population were much greater than expected given that the prevalence of older adults meeting recommended rates of physical activity is less than 16% (CDC, 2002). It is very likely that the reported levels of physical activity for participants in this study are an overestimation of what they are actually doing. According to Anderson and Bartlett (1998) most individuals overestimate their levels of physical activity by about 50 percent. Overestimation of levels of physical activity is even more likely to occur when only self-report measures are used, as in the current study. However, it should be noted that the CHAMPS questionnaire was designed to be very sensitive to small changes in physical activity, resulting in what appears to be higher than expected levels of physical activity, as even small changes in lifestyle physical activity are accounted for (Stewart et al., 2001). Self-reports of physical activity were equally high for participants in both the control condition and the intervention condition, with baseline ratings of weekly caloric expenditure and frequency of physical activity being statistically similar for both groups. Significant increases in weekly caloric expenditure and frequency of physical activity at post-treatment were only present in the intervention group, suggesting that even if the responses were inflated, there was a real change in levels of physical activity in the intervention group when compared to the control group. This is further supported by the study conducted by Harada et al., (2001), which reported that responses on the CHAMPS questionnaire were found to correlate with fitness outcomes, with higher scores on the CHAMPS questionnaire found to be related to greater levels of fitness.



### *Self-Efficacy*

An examination of the effects of the motivational interview on self-efficacy for physical activity found no significant difference in levels of self-efficacy for physical activity between the intervention group and the control group. These findings may be due to the fact that the focus of the motivational interview intervention was on increasing physical activity levels rather than increasing levels of self-efficacy for physical activity. These findings suggest that the relationship between self-efficacy and physical activity is rather complex, with a rise in one not necessarily leading to a rise in the other.

Despite a lack of significant difference in change in self-efficacy for physical activity between groups, it should be noted that level of self-efficacy was found to predict weekly caloric expenditure from physical activity, with higher levels of self-efficacy at baseline predicting greater caloric expenditure from physical activity at post-treatment and at six-month follow-up. These findings were maintained even when baseline caloric expenditure for physical activity time was accounted for. Bock et al. (2001) reported similar results with participants that became physically active enough to meet CDC recommended levels of physical activity reporting higher levels of self-efficacy than participants that did not meet the guidelines.

These findings also support research conducted by Calfas et al. (1997) which found that self-efficacy was predictive of physical activity levels at baseline and four to six week follow-up in an adult population. Similar findings are also reported in the literature regarding physical activity in older adults with Litt et al. (2002) noting that self-efficacy was predictive of physical activity 12 months after treatment and with Allison

and Keller (2004) stating that self-efficacy for physical activity was predictive of distance walked in a week for older adults.

### *Social Support*

The effects of the motivational interview on rating of social support were assessed and demonstrated that the intervention did not lead to participants increasing their ratings of friend or family social support from baseline to post-treatment or six-month follow-up when compared to the control group. These findings are likely due to the focus of the intervention being increasing physical activity and not social support. Social support was assessed by asking participants to rate the support and encouragement that they received for physical activity from friends and family on a scale of one to ten. These results are in agreement with Nichols et al.'s (2000) study which found that social support levels did not differ between the control group and a group that received behavioral skills training to increase physical activity.

### *Stage of Change*

Results examining stage of change found a statistically significant interaction between stage of change and group, with participants in the intervention condition reporting higher stages of change at post-treatment than participants in the control condition. These findings are consistent with expectations given that participants in the intervention group reported higher rates of physical activity, and support the use of stages of change as a measure for understanding current levels of physical activity. These findings also support the utility of motivational interviewing as an intervention to move older adults along the stages of change towards adoption of physical activity with

Prochaska, et al. (1992) stating that an intervention should be viewed as successful if it results in upwards movement in stage of change.

The average movement along the stages of change, even though statistically significant was not equivalent to a full stage, with the average participant in the intervention condition moving from action at baseline to closer to maintenance at post-treatment. It is probable that a ceiling effect occurred in regards to stage of change due to the disproportionate distribution of participants in the various stages of change, including a total of fifty-four out of eighty-three participants in the maintenance stage of change at baseline. These numbers are similar to those described by Riebe et al. (2005) who reported that greater than fifty percent of their sample of older adults were found to be in the maintenance stage of physical activity at baseline, and suggest that programs designed to increase levels of physical activity in older adults may recruit a large number of participants that are actually already active.

The increase in the number of participants in the intervention group in higher stages of change was not maintained at the six-month follow-up. The finding that many of the participants had cycled through the stages of change and reported being at a lower stage of change at the six-month follow-up is not surprising, given that most people go through cycles with physical activity, rather than always maintaining ideal levels of physical activity (Prochaska et al., 1992). The fact that participants in the motivational interviewing condition moved forward in the stages of change is promising despite the fact that this movement was not maintained at six-month follow-up, because the fact of simply having been in the action or maintenance stage of change for physical activity



makes it more likely that these participants will return to the higher stages of change in the future (Prochaska et al., 1992).

Stage of change in this study was found to be a predictor of both frequency of physical activity and weekly caloric expenditure from physical activity. Notably, stage of change at baseline predicted physical activity at post-treatment, but not at six-month follow-up. In each of these cases participants in higher stages of change reported higher levels of physical activity. However, it should be noted that baseline stage of change no longer predicted physical activity levels post treatment after baseline levels of physical activity were accounted for. These findings are not surprising, as stage of change was designed to be a descriptive category for levels of physical activity, and therefore should be capturing the same information as amount of physical activity.

#### Changes in Participants Throughout the Motivational Interview Intervention

In order to better understand the changes that occurred within the participants in the motivational interview condition, weekly ratings of physical activity, confidence for increasing level of physical activity, and motivation/interest in increasing levels of physical activity were assessed during each motivational interview.

#### *Physical Activity*

Physical activity was assessed by asking participants to recall how many times in the past seven days they engaged in at least moderate levels of physical activity and approximately how much time was spent being active per session. Results from a within-subject ANOVA examining physical activity levels in participants at each of the four weeks of the intervention found that changes in levels of physical activity were not significantly different across the weekly sessions.

### *Confidence in Increasing Level of Activity*

Participants' confidence levels for increasing physical activity were assessed weekly during the intervention by asking them to rate on a scale of one to ten how confident they felt in their ability to increase their level of physical activity. Within-subject ANOVAs were used to examine changes in levels of confidence across the four weeks of the motivational interview intervention. Results demonstrate that there was a significant change in levels of confidence across the four week intervention. Post hoc follow-up tests demonstrated significant increases in level of confidence from week one to weeks three and four, and from week two to week three. The increasing levels of confidence as the intervention progressed supports the fundamental principle discussed by Miller and Rollnick (2002) that the motivational interview should result in increasing levels of confidence for physical activity.

However, it should be noted that the relationship between confidence and physical activity in the current study was unclear. Within-subject ANOVAs used to determine whether confidence in preceding weeks could predict physical activity levels in subsequent weeks showed that in only one instance were significant results obtained: confidence ratings in the third week significantly predicted levels of physical activity in the fourth week. It is possible that confidence ratings were only found to be predictive of physical activity from week three to week four because participants required some time of being successful with their physical activity goals before their level of confidence became accurate in predicting physical activity levels.

It is also possible that the weekly measure of confidence for the motivational interview condition, a single rating from 0 to 10, was not as sensitive as the self-efficacy

measure for physical activity used for all participants at baseline, post-treatment, and 6 month follow-up, as scores on the Exercise: Self-Efficacy measure were found to be predictive of physical activity at post-treatment and six-month follow-up.

### *Interest/Motivation for Physical Activity*

Participants' motivation/interest in increasing levels of physical activity was assessed weekly during the intervention by asking them to rate on a scale of one to ten their motivation/interest in increasing levels of physical activity. When these data were examined it was found that ratings of motivation/interest in physical activity increased significantly across the four weeks. All pairwise differences were significant except for the first and second weeks. These findings indicate that as the intervention went on, participants became more interested in increasing levels of physical activity, which helps to demonstrate how the motivational interview was affecting participants and resulting in higher levels of physical activity post-treatment when compared to the control group. This data supports Miller and Rollnick's (2002) theory that motivational interviewing leads the participants to resolving their ambivalence towards physical activity and arriving at their own reasons for engaging in physical activity, which in turn results in greater physical activity.

### *Summary and Conclusions*

The finding that the motivational interview intervention significantly increased the levels of physical activity in older adults in the short term holds promise for the use of motivational interviewing as a brief and cost effective way to increase physical activity levels in older adults from the general community. These findings open a variety of possibilities in program development and in brief care by primary physicians or other



health care professionals. The impact of the brief motivational interviews given over the phone reduces problems of attrition, time constraints, and reaching older adults in the community.

The finding that the effects of the motivational interview were not maintained at six-month follow-up demonstrates the need for an additional component to the intervention, such as a booster session every four to six months. It is unrealistic to expect a single intervention to result in lifestyle changes that last long after the intervention is over, as new barriers to physical activity will arise over time. Just as people are encouraged to have regular medical appointments in order to catch medical conditions early, it would also be beneficial for people to have booster sessions of motivational interviewing for physical activity, in order to help them overcome any new barriers and to reassess goals. Booster sessions have been successfully added to brief interventions designed to increase levels of physical activity, such as in the study conducted by Purath, Miller, McCabe, and Wilbur (2004), which targeted a population of sedentary working women. Booster sessions for motivational interviews have also been recommended by Hettema et al. (2005) as a method for maintaining changes in health behavior. As the motivational interviews can be conducted over the telephone and do not take a lot of time, the cost of these booster sessions would be minimal, especially compared to the cost of inactivity on the healthcare system.

The support of stage of change and self-efficacy as predictors of physical activity in older adults is also important in that it reinforces the usefulness of these measures as ways of predicting physical activity, and allows interventions to be tailored to older adults based on stage of change and level of self-efficacy. Ideally, an intervention could

be developed that would consist of different focuses and supports based on stage of change and level of self-efficacy.

One of the limitations of this study was the disproportionate amount of participants self-identifying as being in the maintenance stage of change at baseline. Older adults in the maintenance stage are currently already doing physical activity and therefore are unlikely to represent the majority of the older adult population on Prince Edward Island or in most of North America. Despite the large number of participants reporting being in the maintenance stage of change, the intervention did result in increases in levels of physical, suggesting that the motivational interview was beneficial for participants in all stages of change including the maintenance stage. It would have been ideal, however, to have more participants in the other stages of change in order to better examine the effects of the intervention on older adults in earlier stages of change.

It should also be noted that the findings of this study, although promising, must be viewed with caution as reported levels of physical activity by participants was unusually high. Either the participants that volunteered for this study were those that were already substantively above the recommended levels of physical activity, or, more likely, the reports of physical activity levels were inflated and did not accurately reflect participants' actual behaviors.

Another limitation of the current study was the lack of diversity in the sample, notably that of ethnic diversity. The current study was also limited in that it solely made use of self-report measures, especially in regards to physical activity. It will be important in future studies to have a physical measure of fitness to provide a more valid view of the participant's fitness levels and improvements as well as the impact changes had on

physical and mental health functioning. This would have been especially beneficial in the current study, as it may have either limited the inflation of reported physical activity or provided information to aid in determining the accuracy of these reports.

Future studies should also compare data from samples across the country in order to glean information regarding trends in the different provinces. Special care should also be taken to enrol greater numbers of participants at all stages of change in order to understand the effect of motivational interviewing in moving older adults along the stages of change towards recommended levels of activity. It would be interesting to examine the impact changes in physical activity have on quality of life, as well as on healthcare expenditures. It would also be beneficial to compare different doses of the motivational interview or the addition of booster sessions in order to determine the best program for long term increases in physical activity.



## Appendix A

### Physical Activity Readiness Questionnaire – Revised (PAR-Q)

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. However, some people should check with their doctor before they start becoming much more physically active.

If you are planning to become much more physically active than you are now, start by answering the seven questions in the box below.

Has your Doctor ever said that you have a heart condition <i>and</i> that you should only do physical activity recommended by a doctor?	Yes	No
Do you feel pain in your chest when you do physical activity?	Yes	No
In the past month, have you had chest pain when you were not doing physical activity?	Yes	No
Do you lose your balance because of dizziness, or do you ever lose consciousness?	Yes	No
Do you have a bone or joint problem that could be made worse by a change in your physical activity?	Yes	No
Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?	Yes	No
Do you know of <i>any</i> other reason why you should not do physical activity?	Yes	No

**If you answered YES to one or more of the questions:**

Talk with your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

- You may be able to do any activity you want — as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out which community programs are safe and helpful for you.

**If you answered NO**

If you answered NO honestly to all PAR-Q questions, you can be reasonably sure that you can:

- start becoming much more physically active – begin slowly and build up gradually. This is the safest and easiest way to go.
- take part in a fitness appraisal – this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively. It is also highly recommended that you have your blood pressure evaluated. If your reading is over 144/94, talk with your doctor before you start becoming much more physically active.

**DELAY BECOMING MUCH MORE ACTIVE:**

- if you are not feeling well because of a temporary illness such as a cold or a fever – wait until you feel better;

**Note: This physical activity clearance is valid for a maximum of 12 months from the date it is completed and becomes invalid if your condition changes so that you would answer YES to any of the seven questions**

## Appendix B CHAMPS - modified

This questionnaire is about activities that you may have done in the past 4 weeks. The questions on the following pages are similar to the example shown below.

### INSTRUCTIONS

If you **DID** the activity in the past 4 weeks:

- \* Step #1 Circle the YES.
- \* Step #2 Think about how many **TIMES** a week you usually did it, and write your response in the space provided.
- \* Step #3 Circle how many **TOTAL HOURS** in a typical week you did the activity.

Here is an example of how Mrs. Jones would answer question #1: Mrs. Jones usually visits her friends Maria and Emma twice a week. She usually spends one hour on Monday with Maria and two hours on Wednesday with Emma. Therefore, the total hours a week that she visits with friends is 3 hours a week.

In a typical week during the past 4 weeks, did you...

Visit with friends or family (other than those you live with)?  <div style="border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; display: inline-block; vertical-align: middle; margin-right: 5px;"></div> <b>YES.</b> If yes, how many times a week <u>2</u>  NO	<b>How many TOTAL <u>hours a week</u> did you usually do it?</b>  Less than 1 hour    1-2 ½ hours <div style="border: 1px solid black; border-radius: 50%; width: 40px; height: 20px; display: inline-block; vertical-align: middle; text-align: center; padding: 2px;">3-4 ½ hours</div> 5-6 ½ hours    7-8 ½ hours    9 or more hours
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If you **DID NOT** do the activity:

Circle the NO and move to the next question



<p><b>In a typical week during the past 4 weeks did you...</b></p>	
<p><b>Dance (such as square, folk, line, ballroom) (do NOT count aerobic dance here).</b></p> <p>YES, if yes, how many times a week _____</p> <p>NO</p>	<p><b>How many TOTAL <u>hours a week</u> did you usually do it?</b></p> <p>Less than 1 hour    1-2 ½ hours    3-4 ½ hours</p> <p>5-6 ½ hours    7-8 ½ hours    9 or more hours</p>
<p><b>Play golf, carrying or pulling your equipment (count <u>walking</u> time only)</b></p> <p>YES, if yes, how many times a week _____</p> <p>NO</p>	<p><b>How many TOTAL <u>hours a week</u> did you usually do it?</b></p> <p>Less than 1 hour    1-2 ½ hours    3-4 ½ hours</p> <p>5-6 ½ hours    7-8 ½ hours    9 or more hours</p>
<p><b>Play singles or doubles tennis.</b></p> <p>YES, if yes, how many times a week _____</p> <p>NO</p>	<p><b>How many TOTAL <u>hours a week</u> did you usually do it?</b></p> <p>Less than 1 hour    1-2 ½ hours    3-4 ½ hours</p> <p>5-6 ½ hours    7-8 ½ hours    9 or more hours</p>
<p><b>Skate (ice, roller, in-line) or cross country ski.</b></p> <p>YES, if yes, how many times a week _____</p> <p>NO</p>	<p><b>How many TOTAL <u>hours a week</u> did you usually do it?</b></p> <p>Less than 1 hour    1-2 ½ hours    3-4 ½ hours</p> <p>5-6 ½ hours    7-8 ½ hours    9 or more hours</p>
<p><b>Do heavy work around the house (such as washing windows, cleaning gutters, shoveling snow).</b></p> <p>YES, if yes, how many times a week _____</p> <p>NO</p>	<p><b>How many TOTAL <u>hours a week</u> did you usually do it?</b></p> <p>Less than 1 hour    1-2 ½ hours    3-4 ½ hours</p> <p>5-6 ½ hours    7-8 ½ hours    9 or more hours</p>
<p><b>Do heavy gardening (such as spading, raking).</b></p> <p>YES, if yes, how many times a week _____</p> <p>NO</p>	<p><b>How many TOTAL <u>hours a week</u> did you usually do it?</b></p> <p>Less than 1 hour    1-2 ½ hours    3-4 ½ hours</p> <p>5-6 ½ hours    7-8 ½ hours    9 or more hours</p>

<p>Work on your car, truck, lawn mower or other machinery?</p> <p>YES, if yes, how many times a week _____</p> <p>NO</p>	<p>How many TOTAL <u>hours a week</u> did you usually do it?</p> <p>Less than 1 hour    1-2 ½ hours    3-4 ½ hours</p> <p>5-6 ½ hours    7-8 ½ hours    9 or more hours</p>
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\*\*\*Please note: For the following questions about running and walking, include use of treadmill.

<p>In a typical week during the past 4 weeks did you...</p>	
<p>Jog or run.</p> <p>YES, if yes, how many times a week _____</p> <p>NO</p>	<p>How many TOTAL <u>hours a week</u> did you usually do it?</p> <p>Less than 1 hour    1-2 ½ hours    3-4 ½ hours</p> <p>5-6 ½ hours    7-8 ½ hours    9 or more hours</p>
<p>Walk uphill or hike uphill (count only uphill part).</p> <p>YES, if yes, how many times a week _____</p> <p>NO</p>	<p>How many TOTAL <u>hours a week</u> did you usually do it?</p> <p>Less than 1 hour    1-2 ½ hours    3-4 ½ hours</p> <p>5-6 ½ hours    7-8 ½ hours    9 or more hours</p>
<p>Walk fast or briskly for exercise (do NOT count walking leisurely or uphill).</p> <p>YES, if yes, how many times a week _____</p> <p>NO</p>	<p>How many TOTAL <u>hours a week</u> did you usually do it?</p> <p>Less than 1 hour    1-2 ½ hours    3-4 ½ hours</p> <p>5-6 ½ hours    7-8 ½ hours    9 or more hours</p>
<p>Ride a bicycle or stationary cycle.</p> <p>YES, if yes, how many times a week _____</p> <p>NO</p>	<p>How many TOTAL <u>hours a week</u> did you usually do it?</p> <p>Less than 1 hour    1-2 ½ hours    3-4 ½ hours</p> <p>5-6 ½ hours    7-8 ½ hours    9 or more hours</p>
<p>Do other aerobic machines such as rowing or step machines (do NOT count treadmill or stationary cycle).</p> <p>YES, if yes, how many times a week _____</p> <p>NO</p>	<p>How many TOTAL <u>hours a week</u> did you usually do it?</p> <p>Less than 1 hour    1-2 ½ hours    3-4 ½ hours</p> <p>5-6 ½ hours    7-8 ½ hours    9 or more hours</p>

<b>In a typical week during the past 4 weeks did you...</b>	
<p><b>Do water exercises (do NOT count other swimming).</b></p> <p>YES, if yes, how many times a week _____</p> <p>NO</p>	<p><b>How many TOTAL <u>hours a week</u> did you usually do it?</b></p> <p>Less than 1 hour    1-2 ½ hours    3-4 ½ hours</p> <p>5-6 ½ hours    7-8 ½ hours    9 or more hours</p>
<p><b>Swim moderately or fast.</b></p> <p>YES, if yes, how many times a week _____</p> <p>NO</p>	<p><b>How many TOTAL <u>hours a week</u> did you usually do it?</b></p> <p>Less than 1 hour    1-2 ½ hours    3-4 ½ hours</p> <p>5-6 ½ hours    7-8 ½ hours    9 or more hours</p>
<p><b>Swim gently.</b></p> <p>YES, if yes, how many times a week _____</p> <p>NO</p>	<p><b>How many TOTAL <u>hours a week</u> did you usually do it?</b></p> <p>Less than 1 hour    1-2 ½ hours    3-4 ½ hours</p> <p>5-6 ½ hours    7-8 ½ hours    9 or more hours</p>
<p><b>Do aerobics or aerobic dancing.</b></p> <p>YES, if yes, how many times a week _____</p> <p>NO</p>	<p><b>How many TOTAL <u>hours a week</u> did you usually do it?</b></p> <p>Less than 1 hour    1-2 ½ hours    3-4 ½ hours</p> <p>5-6 ½ hours    7-8 ½ hours    9 or more hours</p>
<p><b>Do moderate to heavy strength training (such as hand held weights of <u>more than 5 lbs</u>, weight machines, or push ups).</b></p> <p>YES, if yes, how many times a week _____</p> <p>NO</p>	<p><b>How many TOTAL <u>hours a week</u> did you usually do it?</b></p> <p>Less than 1 hour    1-2 ½ hours    3-4 ½ hours</p> <p>5-6 ½ hours    7-8 ½ hours    9 or more hours</p>
<p><b>Do light strength training (such as hand held weights of <u>less than 5 lbs</u>, or elastic bands).</b></p> <p>YES, if yes, how many times a week _____</p> <p>NO</p>	<p><b>How many TOTAL <u>hours a week</u> did you usually do it?</b></p> <p>Less than 1 hour    1-2 ½ hours    3-4 ½ hours</p> <p>5-6 ½ hours    7-8 ½ hours    9 or more hours</p>



<p>Play basketball, soccer, or racketball (do NOT count time on sidelines).</p> <p>YES, if yes, how many times a week _____</p> <p>NO</p>	<p>How many TOTAL <u>hours a week</u> did you usually do it?</p> <p>Less than 1 hour    1-2 ½ hours    3-4 ½ hours</p> <p>5-6 ½ hours    7-8 ½ hours    9 or more hours</p>
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## Appendix C

### Exercise: Stages of Change-Short Form Measure

Regular Exercise is any *planned* physical activity (e.g., brisk walking, aerobics, jogging, bicycling, swimming, rowing, etc.) performed to increase physical fitness. Such activity should be performed *3 to 5 times* per week for *20-60 minutes* per session. Exercise does not have to be painful to be effective but should be done at a level that increases your breathing rate and causes you to break a sweat.

<b>Do you exercise regularly according to the above definition?</b>	Yes, I have been for <u>MORE than 6 months.</u> Yes, I have been for <u>LESS than 6 months.</u> No, but I intend to in the <u>next 30 days.</u> No, but I intend to in the <u>next 6 months.</u> No, and I do <u>NOT</u> intend to in the <u>next 6 months</u>
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## Appendix D

### Exercise: Self-Efficacy

This part looks at how confident you are to exercise when other things get in the way. Read the following items circle the answer that best expresses how each item relates to you in your leisure time.

<b>How confident are you that you can exercise when you are:</b>  <b>Under a lot of stress.</b>	Not at all Confident	Somewhat Confident	Moderately Confident	Very Confident	Completely Confident
<b>How confident are you that you can exercise when you are:</b>  <b>Feel you don't have the time.</b>	Not at all Confident	Somewhat Confident	Moderately Confident	Very Confident	Completely Confident
<b>How confident are you that you can exercise when you:</b>  <b>Have to exercise alone.</b>	Not at all Confident	Somewhat Confident	Moderately Confident	Very Confident	Completely Confident
<b>How confident are you that you can exercise when you:</b>  <b>Don't have access to exercise equipment.</b>	Not at all Confident	Somewhat Confident	Moderately Confident	Very Confident	Completely Confident
<b>How confident are you that you can exercise when you are:</b>  <b>Spending time with friends or family who do not exercise.</b>	Not at all Confident	Somewhat Confident	Moderately Confident	Very Confident	Completely Confident
<b>How confident are you that you can exercise when:</b>  <b>It's raining or snowing.</b>	Not at all Confident	Somewhat Confident	Moderately Confident	Very Confident	Completely Confident

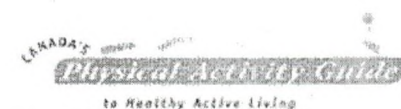


## Appendix E

### Social Support for Physical Activity

<p><b>On a scale of 0 to 10, with 0 being no support and 10 being total support, how would you rate the support / encouragement for physical activity that your receive from family?</b></p>	<p>0    1    2    3    4    5    6    7    8    9    10</p> <p>No Support</p> <p>Total Support</p>
<p><b>On a scale of 0 to 10, with 0 being no support and 10 being total support, how would you rate the support / encouragement for physical activity that your receive from friends?</b></p>	<p>0    1    2    3    4    5    6    7    8    9    10</p> <p>No Support</p> <p>Total Support</p>

Appendix F  
Canada's Physical Activity Guide to Healthy Active Living for Older Adults



## *for Older Adults*

**Canada's Physical Activity Guide to Healthy Active Living for Older Adults  
promotes physical activity in an aging society...**

The Guide serves as a roadmap for older adults - explaining why physical activity is important, offering tips and easy ways to increase their physical activity, and stating how much is needed to maintain good health and improved quality of living later in life.

### **Why should I be active?**

#### **Maintain your health and independence as you age**

Physical activity is one of the most important things you can do to maintain your physical and mental health and quality of life as you get older. Walking, stretching, and keeping your muscles in good condition will help you to maintain your independence.

#### **Physical inactivity makes your body age faster**

Independent living depends on being able to do the things you want to do when you want to do them. To stay independent you need to be able to reach, bend, lift, carry, and move around easily. Staying physically active will help you to keep moving, and stay strong.

### **Think about these facts**

- 60% of older adults are inactive.
- Sitting or lying for long periods is a serious health risk. (World Health Organization)
- Inactivity leads to declines in:
  - bone strength;
  - muscle strength;
  - heart and lung fitness; and
  - flexibility.
- Inactivity is as harmful to your health as smoking.

## **Get active your way**

- at home
  - in your community
  - with friends
  - on the way to and from activities
- ...that's active living!

## **It's never too late...**

### **You're never too old to increase your level of physical activity**

Most people say they gain strength, endurance, and flexibility by becoming more active - including those in their nineties. Almost immediately, many people notice they feel better and getting around is easier.

### **Consider this:**

- The more you move, the better you feel.
- More active older adults have the function and fitness of those much younger.
- More active people prolong their independence.
- Everyone can benefit from increased physical activity
- People with physical limitations and chronic conditions can also benefit by becoming more active.

Increasing your level of physical activity as much as you are able can help offset many of the negative effects of certain diseases and disabling conditions.

## **Be Active, Your Way, Every Day for Life! - Age is no barrier**

### **Being active is very safe for most people**

Start slowly and build up - listen to your body. Accumulate 30 to 60 minutes of moderate physical activity most days. Minutes count - add it up 10 minutes at a time. Not sure? Consult with a health-care professional.

### **Choose a variety of activities from each of these three groups:**

#### **Endurance**

- Continuous activities that make you feel warm and breathe deeply
- Increase your energy
- Improve your heart, lungs, and circulatory system

#### **Flexibility**

- Gentle reaching, bending, and stretching
- Keep your muscles relaxed and joints mobile
- Move more easily and be more agile



## **Strength & Balance**

- Lift weights, do resistance activities
- Improve balance and posture
- Keep muscles and bones strong
- Prevent bone loss
- 

## **Getting started is easier than you think**

- Build physical activity into your daily routine.
- Do the activities you are doing now, more often.
- Walk wherever and whenever you can.
- Start slowly with easy stretching.
- Move around frequently.
- Take the stairs instead of the elevator.
- Carry home the groceries.
- Find activities that you enjoy.
- Try out a class in your community.

Eating well is also important. Follow Canada's Food Guide to Healthy Eating to make wise food choices. Benefits increase as physical activity increases.

## **Benefits when starting out:**

- Meet new people
- Feel more relaxed
- Sleep better
- Have more fun

## **Benefits from regular physical activity:**

- Continued independent living
- Better physical and mental health
- Improved quality of life
- More energy
- Move with fewer aches and pains
- Better posture and balance
- Improved self-esteem
- Weight maintenance
- Stronger muscles and bones
- Relaxation and reduced stress

## **Scientists have proved that being active reduces the risk of:**

- |                        |                   |
|------------------------|-------------------|
| ▪ Heart disease        | ▪ Osteoporosis    |
| ▪ Falls and injuries   | ▪ Stroke          |
| ▪ Obesity              | ▪ Depression      |
| ▪ High blood pressure  | ▪ Colon cancer    |
| ▪ Adult-onset diabetes | ▪ Premature death |

**But what if...**

### **I feel too tired to get started?**

Many of us feel that way, but most people who become physically active say that physical activity helps them feel better and gives them more energy.

It's important to choose activities that you enjoy because that will motivate you.

**Do you like to dance?** Why not turn on some music you like and move to the beat?

**Do you like nature?** Go for a walk and take in the scenery.

**Do you like gardening?** No yard? Try a balcony garden.

**Do you like meeting new people?** Check out the programs for older adults at your community centre, local Y, seniors' centre, or private fitness club.

Talk to your friends and find out what they are doing. Maybe you could try something with one of them.

Even if you have not been very active, once you get started your body will adjust to your energy needs. Just try something... a little bit every day will make a difference.

### **I don't want to exercise?**

I've worked hard all my life, now it's time to relax.

Being active can help you to relax and prolong your independence. Build physical activity into your daily routine. Set yourself a small goal. Staying active is important to your physical and mental health in your retirement years. You have already taken a first step by reading this Guide and Handbook. Choose things that you like to do. Join in activities with people you like to be with. Start with small steps.

Find one activity that you could try, or do more of what you are already doing.

- Take your grandchild for a walk - grandchildren have so much energy, it might inspire you.
- Take a dog for a walk.
- Join your neighbour for a walk.
- Walk to the grocery store and carry home the groceries.
- Do some stretching every day.
- Join a class at the community centre.
- Join a mall-walking program.
- Wash and wax the car.
- Use a wheelchair? No problem, "wheeling" can be as beneficial as walking.

### **I have arthritis or stiff joints?**

Then it is even more important that you make a commitment to doing gentle movements every day to keep your joints flexible. Small amounts of daily activity can make a huge difference and keep you mobile.

Flexibility and strength activities are essential to keep your muscles and joints healthy so that you stay mobile. The more sedentary your lifestyle, the stiffer your joints will become. Seek professional help if you are unsure about what is safe for you.

Here are some suggested activities:

- Home stretching routines
- Aqua fitness programs
- Specialty classes for people with arthritis
- Walking/wheeling
- Tai Chi
- Folk or line dancing

### **I have osteoporosis?**

Bones lose minerals and strength as people age. Serious bone loss is a problem for about 25% of older people. You can prevent some of this bone loss with strength activities.

Your muscles and bones have to be challenged to get stronger or to maintain their strength as you age. Join a beginner's program to learn some techniques that will help you improve your strength. It will help you maintain your independence and quality of life. Ask your doctor or health-care provider what would be safe for you. If you have osteoporosis, being active will still be of great benefit, but activities may need to be adapted to provide that benefit without putting you at risk.

Here are some suggested activities:

- Resistance training that challenges your muscles and bones
- Aqua fitness programs
- Walking
- Folk or line dancing
- Specialized classes for people with osteoporosis

### **I have concerns about my heart? ...I'm afraid that physical activity will do more harm than good.**

Doctors usually recommend activity programs for heart patients. Talk to your doctor or other health-care professional and choose a program that is right for you.

They will probably recommend walking, which is one of the best activities to stimulate your circulation, improve the pumping of your heart, strengthen your lungs, improve your mood, and provide energy to your muscles.

Check out some good walking paths in your community and do one each day to get you started. Ask a friend to join you and make your walk a social outing. Join a mall-walking program where you can meet new people.



Here are some suggested activities:

- Walking at a moderate pace progressing to a brisk pace as you are able
- Swimming
- Dancing
- Skating
- Cross-country skiing
- Cycling
- Specialized programs for people with heart conditions

### **I am unsteady on my feet?**

If your balance is poor, start by doing some activities on a chair, on your bed, or supported by a wall. As you feel stronger, add more activities. You will notice that your strength and balance increase as you progress. If you are not sure what to do, seek help from a health-care professional.

Here are some ideas to get you started:

- Exercises in a sitting or lying position
- Simple yoga movements or stretching
- Slow walking with a cane or with the support of a friend
- Leg and ankle strengthening
- Tai Chi
- Line dancing while holding hands

### **I'm afraid to go out in winter?**

There are devices to help you deal with the ice and snow. You can get "picks" to add to your cane to grip the ice. Get some boots that will give your feet a firm grip. Some people use old ski poles to steady themselves or they buy cleats for their boots. If you still feel that it is unsafe for you to walk outside, try a mall-walking program or, if you live in an apartment, walk the halls.

Check out activity programs in your neighbourhood. Often the staff can help you arrange transportation to an activity. Check out what your neighbours and friends are doing and see if you can join them.

### **The key is to keep moving, even in winter.**

### **I don't have much time...so which activity is best?**

It's best to choose activities that you like and build them into your daily routine. As long as you choose activities from each of the three groups - endurance, flexibility, and strength and balance - your program will give you health benefits and improved function and quality of life.

- Move frequently
- Dance
- Vacuum
- Walk the stairs in your house or apartment
- Wash the floors
- Do some stretches
- Clean up one of the shelves in your kitchen cupboards
- Go for a ten-minute walk
- Walk to the grocery store and carry home the groceries
- Wash and wax the car

Every little bit helps, but more is better. The more you do, the better you'll feel. Increase your activities as your body adjusts to your new physically active lifestyle.

### **How some people got started**

#### **Meet Maria**

Maria is 80 years old and frail. She walks with a cane. At her last check-up her doctor told her she needed to build more physical activity into her life. She laughed, "Doctor, I'm 80 years old and now I'm supposed to worry about getting exercise?" "You will, if you want to stay living independently," her doctor told her. "If you sit around cooped up in your house, you will get weaker and weaker and soon you won't be able to do the things you want to do." Maria was shocked. She thought about getting out, but she was too tired.

#### **Bird-watching with a friend got her attention**

One day a friend of hers told her that she was walking every day and had taken up bird-watching with others. Her friend suggested they go together. As Maria made friends in the group she found out about a yoga class for people just like her and she joined that as well.

#### **More active, feeling stronger**

She still walks with a cane or with the support of a friend but enjoys walking in the outdoors or at the mall. She admits she now has more energy.

#### **Meet Jason**

Jason is 68. He had a mild heart attack. He was sedentary and his doctor insisted that he needed to be more physically active. His first reaction was fear that strenuous activity would cause another attack. However, his doctor referred him to a local Cardiac Rehabilitation Program. "Start slowly and progress gradually," his doctor said. "You'll feel better, your heart muscle will grow stronger, and you will be able to do more of the things you want to do with less worry."



## **Met other people with heart trouble and started to feel better**

Jason was a little nervous the first day he went to the program but the instructors and other participants made him feel welcome very quickly. The program involved walking and stationary cycling, and an instructor led the group through flexibility, endurance, and strength activities. Jason was shown how to monitor his heart rate and effort level and to learn what the right activity level "felt like." Other participants shared their experiences with Jason, telling him how much better they felt as a result of the program.

## **No longer afraid and feeling much more able**

After a couple of months, Jason was feeling pretty good and had really built up his confidence. The program meets twice a week and he wouldn't miss it for anything. He and a few buddies from the program also get together a few times a week on their own to go for a walk, ride the stationary bike, or go for a swim at the community centre. They plan to do some cycling on the local bike trails when the warmer weather comes. Jason finds himself taking the stairs instead of the elevator most of the time, and he is no longer out of breath doing simple tasks around the house.

## **Meet Elsa**

Elsa is 75. She had always loved the water, but she didn't have the energy to go swimming as she had done when she was younger. She missed her activities and was beginning to spend a lot of time watching TV. The more she sat around, the more tired she got. She was beginning to find that even simple chores around the house were becoming difficult. She was having trouble washing and combing her own hair. She was worried. She did not want to end up dependent on her family - she enjoyed her independence, but her physical limitations were beginning to scare her.

## **Family helps to get Elsa moving**

When Elsa's daughter tried to find out what was bothering her mother, all she heard was, "I'm just getting too old." Elsa's daughter went to the Y and looked for some literature about helping older adults cope and then talked to a professional. She offered to take Elsa to the Y and help her try some things.

## **Her love of the water got her active again**

At the pool, Elsa saw a class of older women just like her in the water. They were joking and laughing and seemed to be having such a good time. They were doing water aerobics in a heated pool. Maybe I could do that, she thought. The instructor suggested that Elsa come and try a couple of classes before she signed up. After a few weeks, she found herself actually enjoying it and making some new friends as well. The instructor was helping her build up the strength in her arms as well with small weights before the water program. She now feels stronger and more able to cope and is not as fearful about losing her independence and quality of life. She now has no trouble washing and combing her



hair. Her new friends asked her to join them for a mall-walking program in the winter, and in the summer they walk in the neighbourhood park.

### **Meet Li**

Li is 65. She is a small woman and has never been very strong, but she has always loved gardening. She had become very depressed and bored after she retired from her job. She began to sleep a lot and rarely did any activity. She missed her yard since she moved to an apartment and did not know what to do with her time.

### **Community garden allotments help Li get active again**

Li's friends began to worry about her and found her a garden plot very close to the seniors' apartments where she was living. Li was thrilled and determined to make it the best garden on the block. Every day she is out there digging, weeding, planting, and trimming...and her energy level has improved. But what was she going to do in the winter? One of the other gardeners told her about a mall-walking program and asked her to join it with her. Through her new friends she found out about a T'ai Chi class as well, and she loves it so much she now does it summer and winter. Getting physically active changed Li's life. She has a whole group of new friends. Her spirits have lifted and she feels stronger and more secure.

### **Meet Louis**

Louis is 72. He was very active until he retired and then his life changed. He began to sit around, read, and watch TV - after all, he was retired and it was time to take it easy. He soon found himself getting very sluggish and stiff. Often he found himself staying in bed until noon and yet he was still tired.

### **Friend tells him to get moving**

**"Just because you have retired doesn't mean you can sit around all the time,"** his friend told him. "Your body needs to move to live." Louis decided to join a physical activity program at his community centre with his friend. They had special rates for seniors so it wasn't going to cost him very much. A fitness professional at the community centre helped him develop a program that would build his strength and endurance as well as increase his flexibility. At first, he found it hard. His muscles were out of shape, but he kept at it. He has found some buddies his own age and they encourage each other on the stationary bikes and in the weight room. His energy has improved and he no longer feels sluggish and tired.

## Taking the first step is the hardest part

Just like you, all of these people had to take a first step. Healthy aging and independent living depend upon physical activity. What types of activities interest you? Choose something that you want to do. Start slowly and build up gradually until you are able to do 30 to 60 minutes of moderate activity most days of the week.

And remember, choose activities that will:

- build your endurance;
- increase your flexibility; and
- improve your strength and balance.

If you still don't know what you would like to do, maybe your first step is to get more information and more ideas from health-care professionals, community centres, and your friends.

**Let's look at a typical week for someone like you who is physically active...**

**Add it up - 30 to 60 minutes a day built right into your routine**

<b>Sunday</b>	Stretching	Meet bird-watching group for the afternoon	Walk to a friend's house and back after dinner (10 minutes each way)
<b>Monday</b>	Take the linen off the beds and wash, re-make the beds	Aqua fitness class at community centre (45 minutes)	Walk with a friend after supper (15 minutes)
<b>Tuesday</b>	Clean some shelves in the kitchen	Walk to the park in summer, in the mall in winter (30 minutes) Wash the kitchen floor, or wash and wax the car	Lift some weights or soup cans to strengthen arms
<b>Wednesday</b>	"Stretch and hold" exercises	Go to the store and carry home the groceries (30 minutes) Work in the yard	Walk after supper with grandchildren and their dog
<b>Thursday</b>	Stretching	Walk to the doctor's office or some other appointment (20 minutes)	Folk dance class at community centre (30 minutes)
<b>Friday</b>	"Stretch and hold" exercises	Go to the mall and take stairs instead of elevator - meet some friends for lunch	Lift some weights while watching TV - focus on arms Work in yard
<b>Saturday</b>	Try a yoga program on TV	Go to the store and carry home groceries (30 minutes) Vacuum (10 minutes)	Lift some weights while watching TV - focus on legs

- Be physically active every day
- Start where you can and gradually build up
- Every little bit counts
- Add it up! Add up a variety of activities each day in order to reach your goals

**Check out these community contacts to see what can help you build physical activity into your life:**

- Talk to the local recreation department to see what programs they have for older adults;
- Ask about safe walking paths and mall-walking programs in your community;
- Check out the seniors' centres in your neighbourhood;
- Ask the local Y or fitness clubs if they have programs at a reduced cost for older adults;
- Visit health centres and clinics to help you plan a program;  
Ask physicians or other health-care providers to help you decide what's right for you;
- Approach health organizations such as The Osteoporosis Society, Heart and Stroke Foundation, and The Arthritis Society to help you choose programs that are right for you;
- Visit libraries and bookstores to get information about physical activity; and
- Ask your local health department to help you find what is available in your community.

**Communities can make it easier for everyone to be more physically active.**

An active living community helps make active choices easy choices by:

- encouraging community use of schools for older adult physical activity programs;
- recruiting older adults as volunteers in supervising young children in active (walking) transportation to and from school;  
promoting physical activity in community parks, recreation facilities, older adult residences, and special events;
- opening shopping centres to facilitate walking programs in the winter;
- facilitating transportation to and from physical activity programs for older adults in need; and
- sponsoring safe, active transportation through bike paths and lanes, well-lit and scenic walking trails, pedestrian-friendly neighbourhoods, snow- and ice-cleared walkways, and secure bike parking at local businesses.

Ask your community leaders what they are doing to help people like you be physically active in your community.



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